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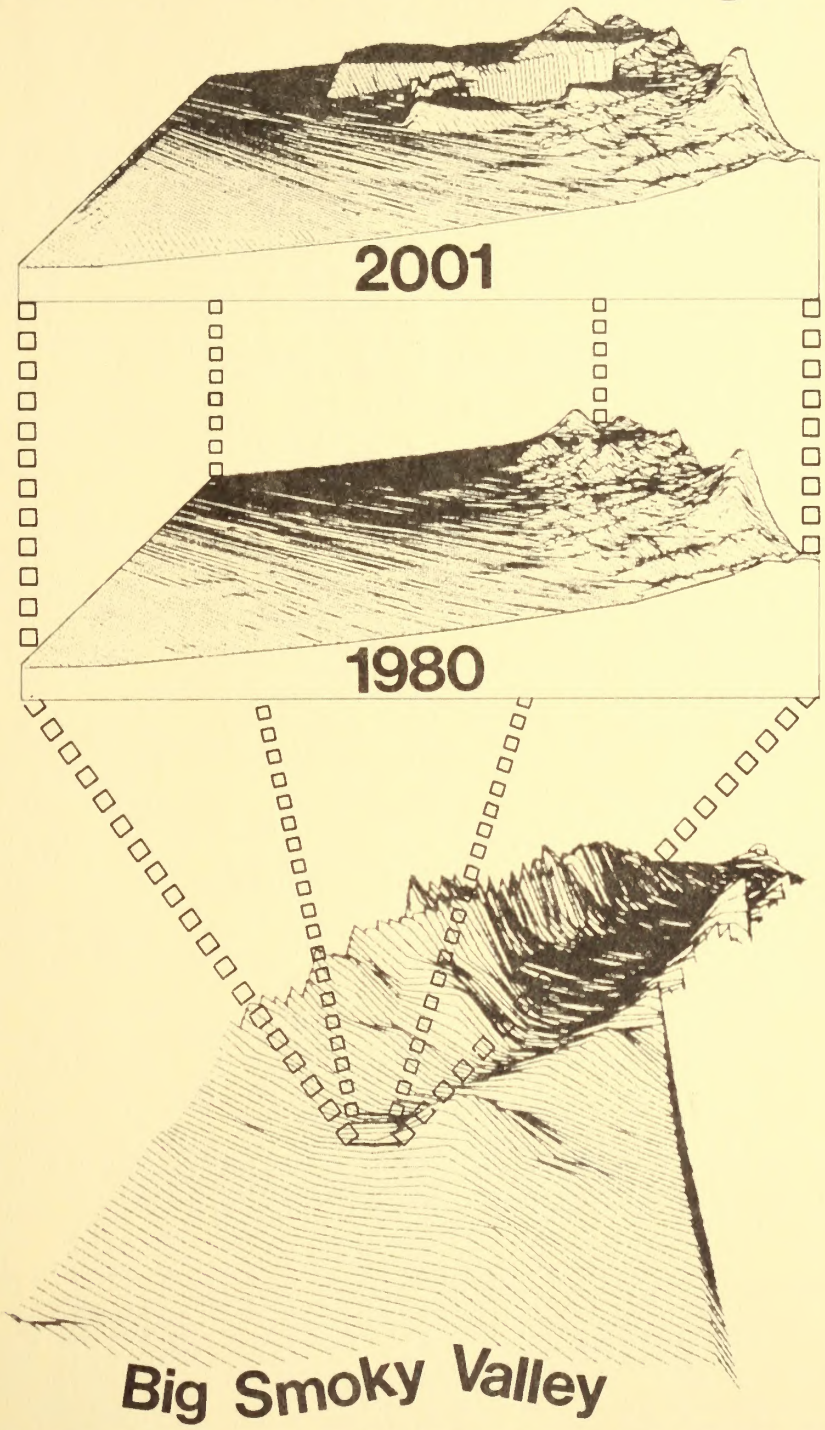
VISUAL RESOURCES TECHNICAL REPORT
Anaconda Nevada Moly Project



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VISUAL RESOURCES TECHNICAL REPORT

Support Document for the Draft Environmental Impact Statement

Anaconda Nevada Moly Project.

Lead Agency:

U.S. Department of the Interior
Bureau of Land Management
Nevada State Office
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Reno, Nevada 89520

PREPARED BY

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
FORT COLLINS, COLORADO

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PREFACE

The Anaconda Copper Company of Denver, Colorado, plans to develop an open pit molybdenum mine and flotation mill plant on privately owned land and public land on which the company has located mining claims under the general mining laws, approximately 18 miles north of the town of Tonopah in Nye County, Nevada. In order to supply power to the Anaconda project, Sierra Pacific Power Company of Reno, Nevada, has filed with the U.S. Bureau of Land Management (BLM) an application for a right-of-way to construct and operate a 230 KV electric transmission line which would cross 86 miles of public land in the Big Smoky Valley in Nye and Lander Counties. Sierra Pacific's right-of-way application initiated BLM's environmental analysis process and the decision was made to prepare an Environmental Impact Statement (EIS) on the proposed transmission line and the Anaconda mine/mill complex. The EIS is being prepared on a contract basis by Environmental Research & Technology, Inc. (ERT), of Fort Collins, Colorado.

This report was prepared by ERT as a preliminary step in the EIS preparation process. The report provides detailed information on the visual resources in potentially affected areas and discussed the impacts of the proposed project on these resources.

The visual resources technical report is one of a series of ten technical reports prepared by ERT as background and documentary material for the EIS. Each report presents the results of field and literature studies in the affected environments and results of impact analyses. The technical reports are intended as background documents and information in them is, in many cases, considerably more detailed than will be included in the EIS.

Chapter 1, "Alternatives Including the Proposed Action," can be found in the Draft Environmental Impact Statement which is on file with copies of the ten technical reports at the following locations: BLM offices in Washington, DC.; Reno; Battle Mountain; Carson City; Elko; Ely; Las Vegas; and Winnemucca, Nevada. The following public libraries will also receive copies: the Churchhill Public Library, Fallon; Clark County Library, Las Vegas; the Elko County Library, Elko; the Esmeralda County Library, Goldfield; the Eureka County Library, Eureka; the Lander County Library, Battle Mountain; the Mineral County Library, Hawthorne; the Nevada State Library, Carson City; the Nye County Library, Tonopah; the Washoe County Library, Reno; and the White Pine County Library, Ely. Draft EISs will also be sent to the University of Nevada Library in Reno and Las Vegas.

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CHAPTER 1

ALTERNATIVES INCLUDING THE PROPOSED ACTION

[Can be found in the Draft Environmental Impact Statement which is on file with the technical reports.]

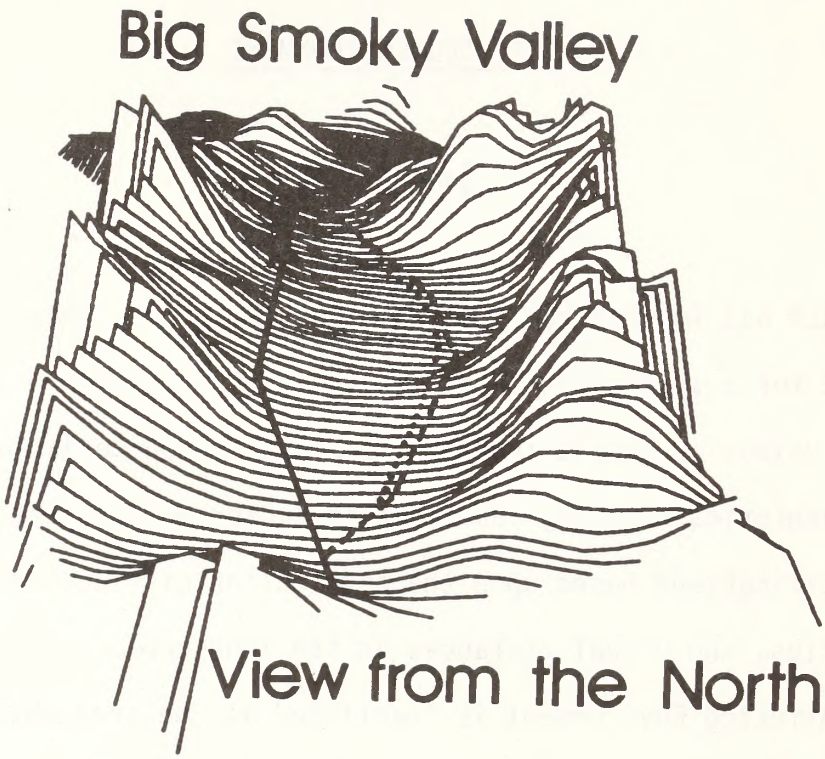
CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

The BLM has implemented a visual inventory and evaluation process to provide for a systematic inter-disciplinary approach to the management of visual values on public lands. The Visual Resource Management (VRM) system inventories existing landscape character and assigns visual management classifications based upon the combination of visual qualities, visual sensitivities, and visual distances in the landscape.

The Affected Environment is identified as the area which might potentially be influenced by the Proposed Actions and/or Alternatives. The Study Area for this project is defined by a generalized viewshed analysis which identifies all land areas for which the proposed facilities could be visible. The accompanying computer-generated sketches (Figures 2-1 and 2-2) demonstrate the topography of the Study Area from the south and north and the topography of the proposed mine/mill site from the southwest.


Big Smoky Valley
View from the North

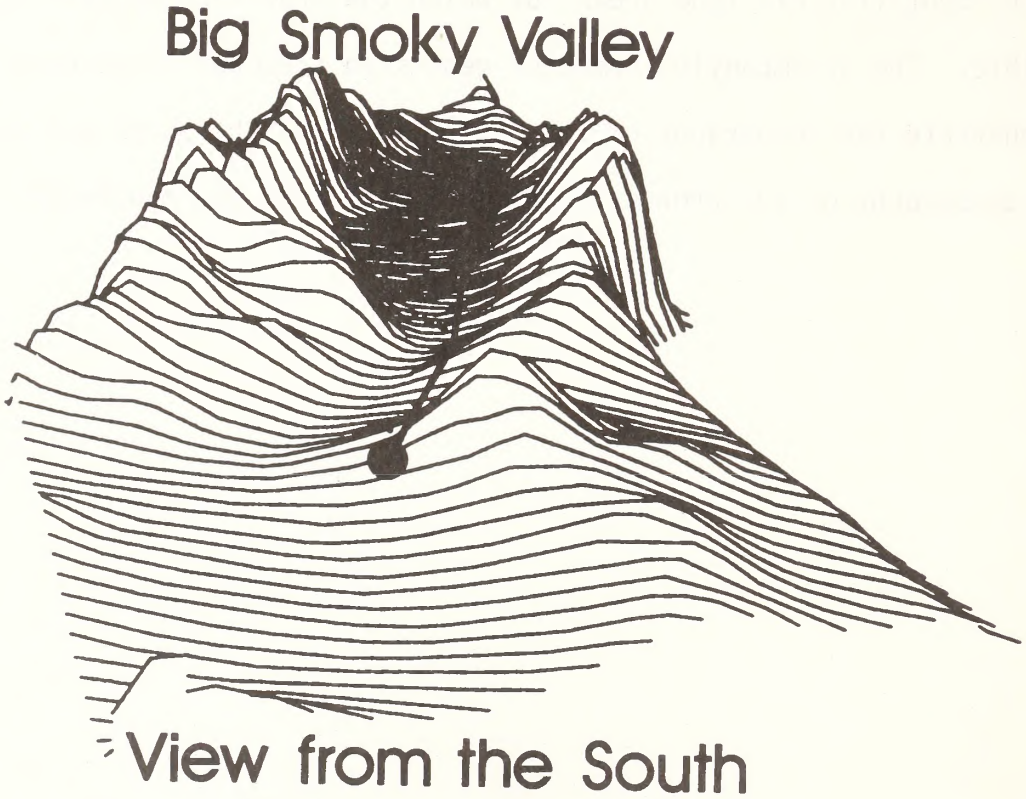

Big Smoky Valley
View from the South

Figure 2-1.

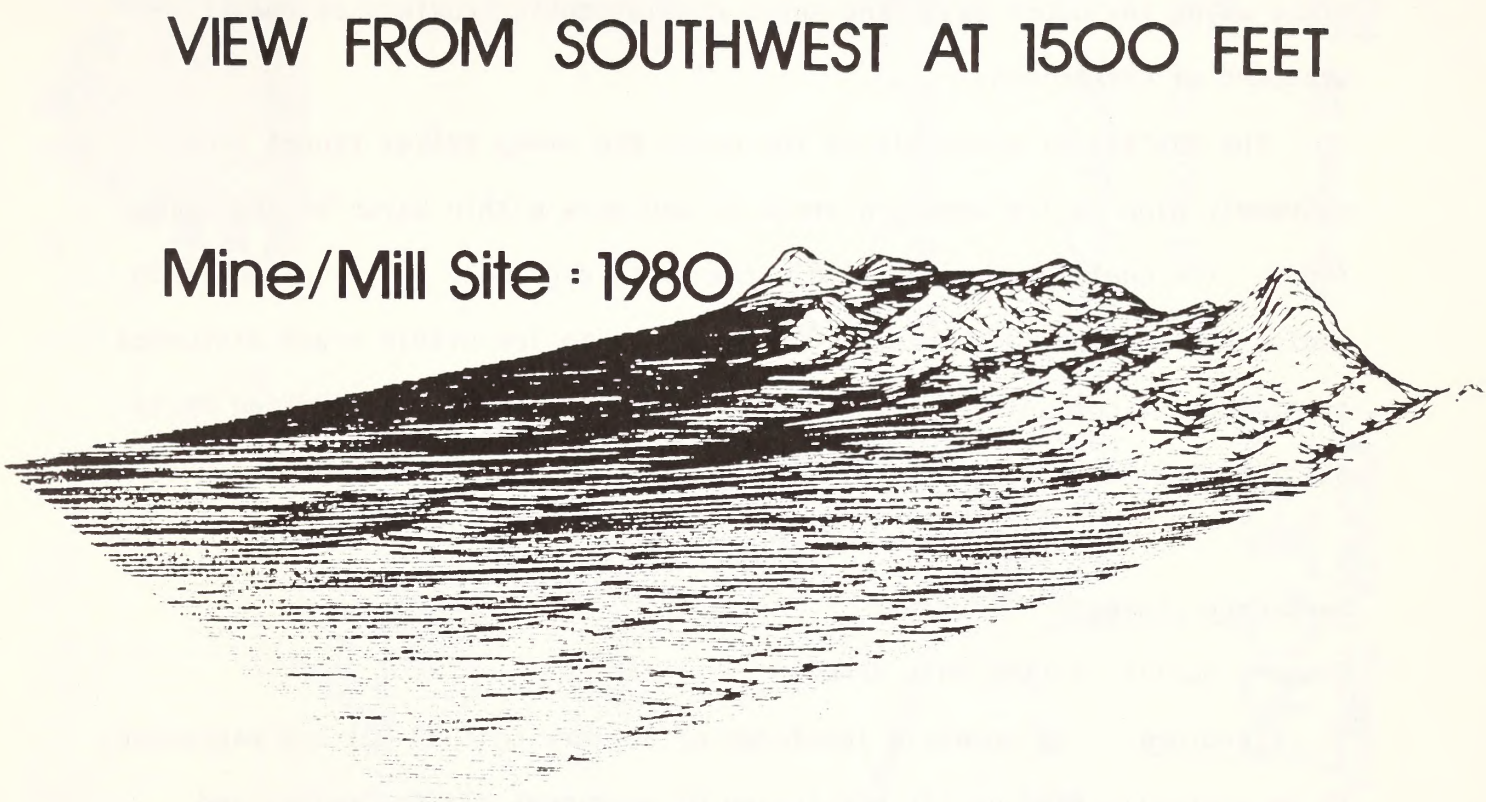


Figure 2-2.

REGIONAL OVERVIEW

The Study Area's visual characteristics, qualities, and management classes were defined by the Bureau of Land Management, Battle Mountain District Office, Battle Mountain, Nevada. Scenery qualities were determined using the upper Basin and Range Physiographic Province as the standard of comparison.

The quality of views within the upper Big Smoky Valley ranges from extremely high in the mountain areas to mediocre within parts of the valley floor. The quality of views within the lower Big Smoky Valley ranges from mediocre along the foothills and valley floor to low within areas disturbed by mining and community development. Sixteen Scenery Quality Rating Units exist in the Study Area (Figure 2-3).

Landscape Character

Scenery Quality Rating Unit MP-001

Landform. The mountain landforms of Scenery Unit MP-001 are expressed by an unusually high uplift consisting of prominent cliffs, spires and outcrops. Colors range from grey to light brown, dark brown, pink, and white within the rock and bare earth. Textures are predominantly coarse.

Vegetation. Vegetation in this area is predominantly pinyon pine, juniper and sage. Forms and lines are not significant. Colors range from deep greens, yellows, and greys to vivid yellows and reds within the scattered riparian areas in fall.

Structures. The structures in this area do not exhibit significant forms, lines, colors, or textures.

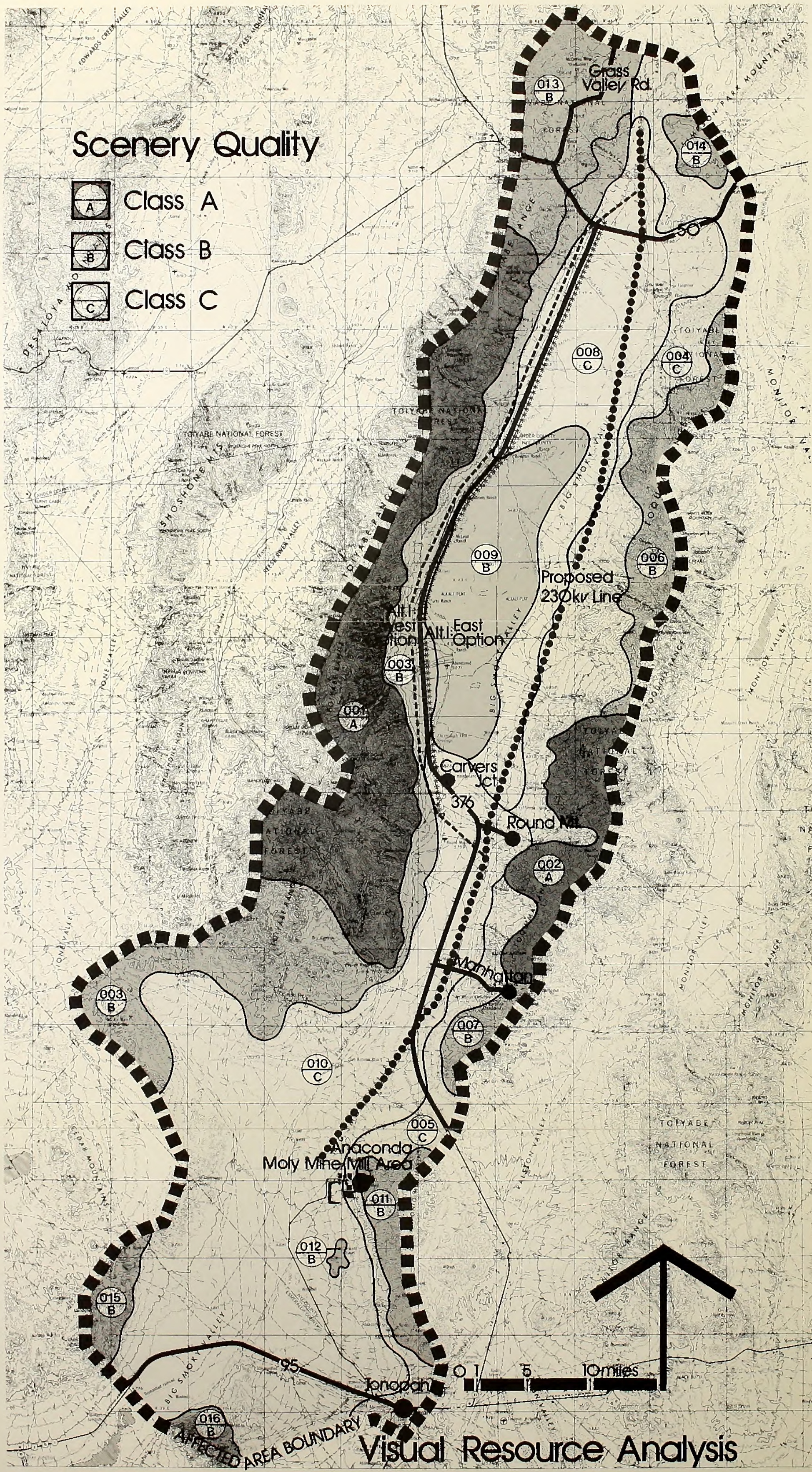


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Figure 2-3. Big Smoky Valley, Nevada

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Denver, Colorado

Prepared by: ERT
Fort Collins, Colorado

Scenery Quality Rating Unit MP-002

Landform. The mountain landforms of Scenery Unit MP-002 are expressed by an unusually high uplift consisting of prominent cliffs, spires and outcrops. Mt. Jefferson, elevation 11,949, is located within this unit. Colors range from grey to light brown, dark brown, pink, and white within the rock and earth formations. Textures are predominantly coarse.

Vegetation. Vegetation in this area is predominantly pinyon pine, juniper, and sage. Forms and lines are not significant. Colors range from deep greens, yellows,and greys to vivid yellows and reds within the scattered riparian areas in fall.

Structures. The structures in this area do not exhibit significant forms, lines, colors, or textures.

Scenery Quality Rating Unit MP-003

Landform. The landforms of Scenery Unit MP-003 consist of the bajadas of the Toiyabes. These broadly sloping alluvial fans exhibit planar forms with occasional notches in stream areas. Colors are typically red. Textures are fine grained.

Vegetation. The vegetation within this Scenery Unit is predominantly sage. Occasional riparian areas form small walls within the Unit. Colors range from grey to green and yellow. Textures are fine grained.

Structures. Structures in this area are formed in rectangular clusters. Colors range from white to yellow. No textures are apparent.

Scenery Quality Rating Unit MP-004

Landform. The landforms of Scenery Unit MP-004 consist of the bajadas of the northern Toquimas. These broadly sloping alluvial fans exhibit planar forms with occasional notches in stream areas. Colors are typically red and black. Textures are fine grained.

Vegetation. The vegetation within the Scenery Unit consists of sage with occasional riparian areas near Scenery Unit MP-002. Colors range from greys to greens and yellows. Textures are fine grained.

Structures. Structures in the Round Mountain area are quite significant in the landscape. Structures exhibit strong block forms and a multitude of colors.

Scenery Quality Rating Unit MP-005

Landform. The landforms of Scenery Unit MP-005 consist of the bajadas of the San Antonios and southern Toquimas. Landforms are planar with occasional notches and continuously horizontal. Colors range from reddish to yellowish, light brown, and dark brown. Textures are fine grained.

Vegetation. This Scenery Unit is blanketed with grey-green sage vegetation. Textures are fine grained.

Structures. Structures in the Tonopah area are very significant in the southern portion of this Scenery Unit. Forms are strongly block shaped. Colors are multitudinous.

Scenery Quality Rating Unit MP-006

Landform. The landforms of Scenery Unit MP-006 consist of moderately high, fault block mountains. Forms are angular with blocks displaying rounded edges. Colors range from white to pinks, blacks, and browns. Textures are moderately grained.

Vegetation. Vegetation in this Scenery Unit consists of islands of pinyon pine and juniper surrounded by sage. Colors range from grey-green to dark green and yellow-green. Textures are moderately grained.

Structures. Structures are not significant in this landscape.

Scenery Quality Rating Unit MP-007

Landform. The landforms of Scenery Unit MP-007 consist of moderately high, fault block mountains. Forms are angular with blocks displaying rounded edges. Colors range from white to pinks, blacks, and browns. Textures are moderately grained.

Vegetation. Vegetation within this Scenery Unit consists of islands of pinyon pine and juniper surrounded by sage. Colors range from grey-green to dark green and yellow-green. Textures are moderately grained.

Structures. Structures in the Manhattan area are significant in the landscape. Structures exhibit block forms and a multitude of colors.

Scenery Quality Rating Unit MP-008

Landform. The predominant landform of this Scenery Unit is a horizontal valley bottom. Colors are not significant. Textures are fine grained.

Vegetation. This Scenery Unit is blanketed by sage which is grey-green in color. Textures are fine grained.

Structures. Ranch buildings contribute minor block forms in this Scenery Unit.

Scenery Quality Rating Unit MP-009

Landform. The landform of this Scenery Unit is a flat alkaline sink or playa. Colors range from pink to blue, white, greens, black, and yellows. Textures are fine grained. Water is a significant feature in this area.

Vegetation. Vegetation varies from islands of brush to blankets of grass. Colors range from green to red and grey. Textures are fine grained.

Structures. Widely dispersed ranch structures display minor block forms in this landscape.

Scenery Quality Rating Unit MP-010

Landform. This Scenery Rating Unit exhibits a flat valley bottom. Colors are grey. Textures are fine grained.

Vegetation. This area is mainly covered by a grey-green, fine textured, blanket of sage.

Structures. Widely dispersed ranch structures display minor block forms in this landscape. The Carver area displays a variety of red, white, yellow, black, pink, brown, and blue block forms.

Scenery Quality Rating Unit MP-011

Landform. This Scenery Unit exhibits a moderately high mountain area with some steep canyons and several mesas. Forms are angular with round edged blocks. Colors are white, pink and black. Landform textures are moderately grained.

Vegetation. Vegetation in this Scenery Unit consists of pinyon/juniper forests mixed with areas of sage. Colors range from grey-green to dark green and yellow-green. Textures are moderately grained.

Structures. Structures are not significant in this Unit.

Scenery Quality Rating Unit MP-012

Landform. This Scenery Unit is composed of the Crescent Sand Dunes. Forms are crescent shaped, curvilinear, and white in color. Textures are very fine grained.

Vegetation and Structures. Vegetation and structures do not exist in this area.

Scenery Quality Rating Unit MP-013

Landform. Landforms in this Scenery Unit are expressed as moderately high mountains. Forms are angular with round edged blocks. Colors are light brown and grey. Textures are moderately grained.

Vegetation. Vegetation consists of islands of pinyon/juniper forest with sage and grass areas interspersed. Colors range from grey-green to dark green and yellow-green. Textures are moderately grained.

Structures. This Scenery Unit contains the 230 KV transmission line intertie. This structure exhibits a moderately strong horizontal and vertical character. Other structures are not significant in this Scenery Unit.

Scenery Quality Rating Unit MP-014

Landform. The landform of this Scenery Unit is predominantly mountainous. Forms are angular with round edged blocks. Colors are light brown and grey. Textures are moderately grained.

Vegetation. Vegetation consists of islands of pinyon-juniper forest with sage and grass areas interspersed. Colors range from grey-green to dark green and yellow-green. Textures are moderately grained.

Structures. This Scenery Unit contains the 230 KV transmission line intertie. This structure exhibits a moderately strong horizontal and vertical character.

Scenery Quality Rating Unit MP-015

Landform. The landform of this Scenery Unit consists of angular mountains. Colors range from light brown to grey.

Vegetation. Vegetation patterns are formed predominantly by sage and various arid region grasses. Colors range from green to grey-green.

Structures. Structures are not noticeable in this Scenery Unit.

Scenery Quality Rating Unit MP-016

Landform. The landform of this Scenery Unit consists of angular mountains. Colors range from light brown to grey.

Vegetation. Vegetation patterns are formed predominantly by sage and arid region grasses. Colors range from green to grey-green.

Structures. Structures are not noticeable in this Scenery Unit.

Cultural Modifications

The accompanying Table (Table 2-1), photographs (Figure 2-4), and Cultural Modifications Map (Figure 2-5) demonstrate the influence of cultural modifications upon the character of the landscape. Four major types of cultural modifications exist in the Study Area. These include: (1) scattered ranches and residences; (2) gravel roads and transmission structures; (3) small communities; and (4) gravel storage areas and mining operations.

Positive contrasts are caused by the dispersed ranches. The block forms and green colors exhibited by ranch structures and trees add positive variety where they occur.

Low levels of contrast are caused by the many roadways and single pole transmission lines. Slight line and color variations cause these slight contrasts.

High levels of contrast are caused by the communities of Carver, Round Mountain, Manhattan, and Tonopah. Discordant colors cause highest contrasts.

Moderate to high levels of contrast are caused by the Round Mountain tailings disposal areas, the roadside gravel storage piles, and the many disturbed exploration areas and working mines.

TABLE 2-1

CULTURAL MODIFICATIONS INVENTORY

No.	Description	Type[a]	Feature Contrast[b]	Acreage	Rehab. Potential[c]	Success Potential[d]	Effect on Vis. Qual.
1	Rest area	3	3	5			Positive
2	Substation	3	3	8	1	1	Negative
3	Power line	3	1				Neutral
4	Tonopah	3	3	25,000	1	1	Negative
5	Mine site	3	1	100	2	3	Neutral
6	Bridge well	3	1	<1	2	3	Positive
7	San Antonio ranch	3	2	20			Positive
8	Gravel piles	1	3	5	2	3	Negative
9	Manhattan mine	1	2	100	1	1	Neutral
10	Power line	3	2				Negative
11	Alfalfa ranch	1	3	640			Positive
12	Ranch	3	2	70			Positive
13	Meadow ranch	3	3	640			Positive
14	Round Mountain Mine	3	3	700	1	1	Negative
15	Round Mountain community	3	3	400	1	1	Negative
16	Power line	3	2				Negative
17	Ranch	3	3	10			Positive
18	House	3	3	<1	1	1	Neutral
19	Ranch (irrigated)	3	3	200			Positive
20	Carver community	3	3	200	1	1	Negative
21	Irrigated meadow	1	3	50			Positive
22	Power line (both sides)	3	2				Neutral
23	Ranch	3	3	50			Positive
24	Ranches (3)	3	3	30 (10 ea)	2	3	Positive
25	Gravel piles	1	3	50			Negative
26	Ranch	3	3	200			Positive
27	Ranch	3	3	50			Positive
28	Ranch	3	3	100			Positive
29	Ranch	3	3	100			Positive
30	Ranch	3	2	100			Positive

TABLE 2-1 (cont.)

No.	Description	Type[a]	Feature Contrast[b]	Acreage	Rehab. Potential[c]	Success Potential[d]	Effect on Vis. Qual.
31	Gravel piles	1	3	50			Negative
32	Ranch	3	3	50	2	3	Positive
33	Ranch	3	3	100			Positive
34	Ranch	3	3	100			Positive
35	Old stone house	3	2	<1			Positive
36	Kingston Ranch Land Dev.	3	3	2000 (small parcels)	1	2	Negative
37	Ranch	3	3	200			Positive
38	"Sprawling" ranch	3	3	500	1	2	Negative
39	Ranch	3	3	200			Positive
40	Gravel piles	1	3	20	2	3	Negative
41	Roadside cafe	3	3	10	1	1	Negative
42	Dirt road (Toquima Cave)	1	2		1	1	Negative
43	230 KV Transmission Line Intertie	3	3		1	1	Negative
44	Manhattan Community	3	3		1	1	Negative

[a]Land and Water (1), Vegetation (2), Structure (3)

[b]Low--indicates that the contrast can be seen, but does not attract attention (1)
Medium--the contrast begins to dominate the characteristic landscape (2)
High--demand attention, will not be overlooked (3)

[c]Modification (1)
Elimination (2)

[d]Low--probability is low that a change will be made, or success would be limited to meet low contrast (1)
Medium--difficult to accurately evaluate success, but chances look promising to meet low contrast (2)
High--fairly certain contrast can be satisfactorily reduced to meet low contrast (3)

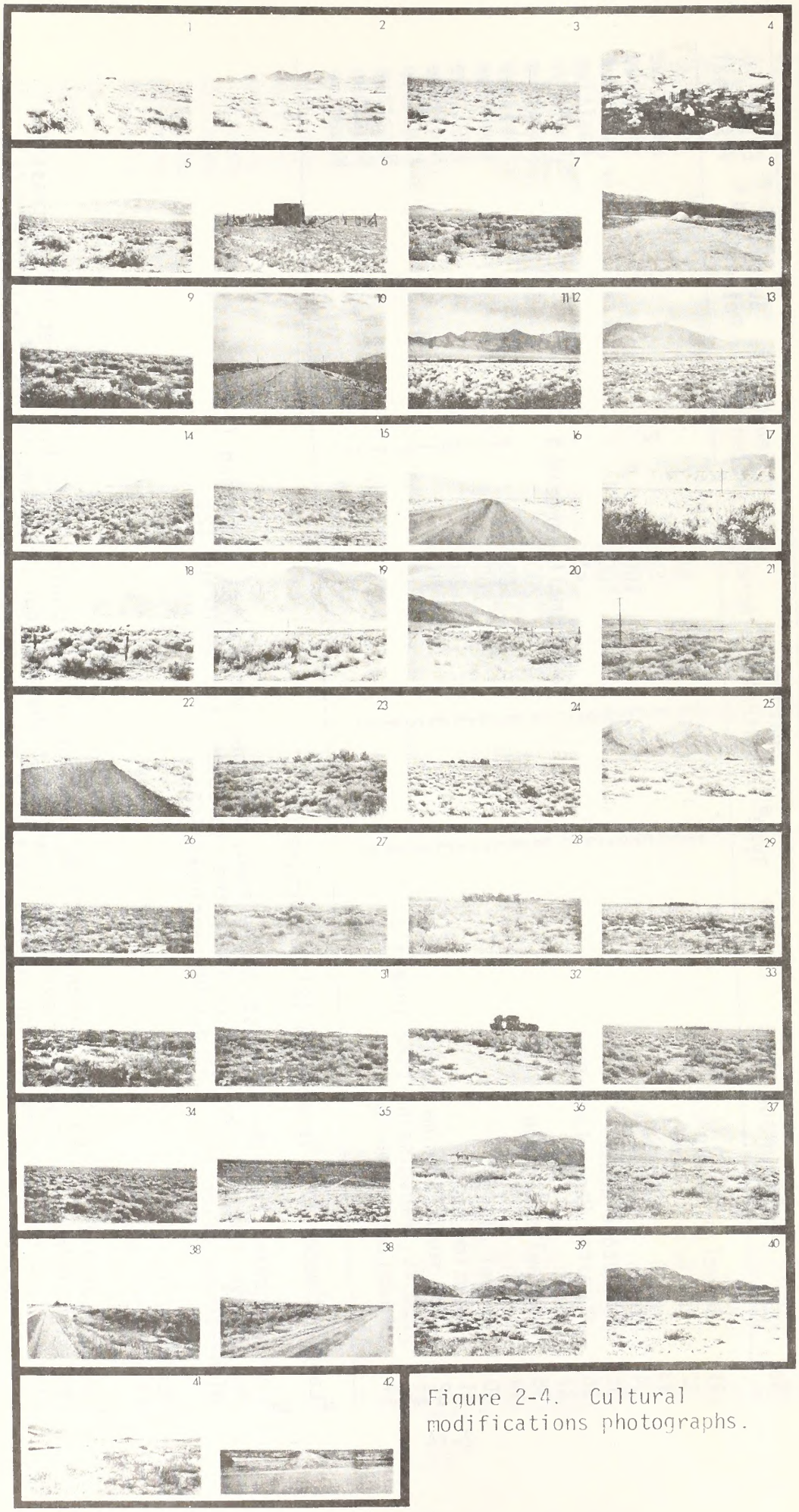
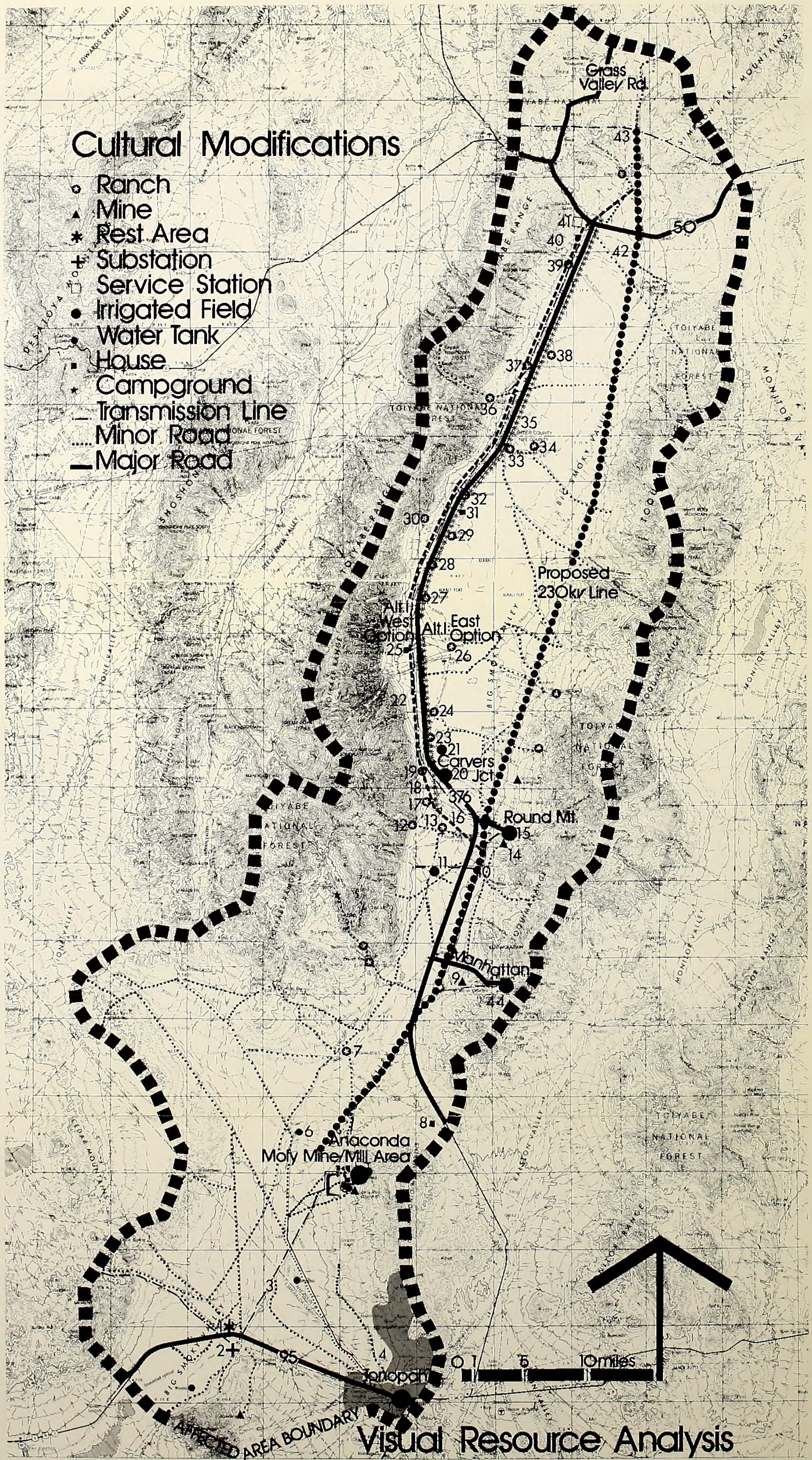


Figure 2-4. Cultural modifications photographs.



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Big Smoky Valley, Nevada

Prepared for: Anaconda Copper Co.
Denver, Colorado

Prepared by: ERT
Fort Collins, Colorado

Figure 2-5.

Scenic Quality

Three levels of scenic quality exist in the Study Area. The Toiyabe Range and the Mount Jefferson area of the Toquima Range are classified as Class A scenery. The southern and northern Toquimas, the northern Toiyabes, the west and central areas of the Upper Big Smoky Valley, the San Antonio Mountains and the Crescent Sand Dunes are classified as Class B Scenery. Remaining low lying areas of the Upper and Lower Big Smoky Valley are classified as Class C Scenery. The accompanying Scenery Quality Map (Figure 2-3) demonstrates the geographic locations of Scenery Quality Rating Units and relative levels of scenery quality.

Landform

Landforms of the Toiyabe Range and Mount Jefferson area of the Toquima Range are characterized by prominent, vertical rock cliffs. Mount Jefferson, at more than 11,000 feet, is the fourth highest peak in Nevada. Remaining landforms in the Study Area are composed of low rolling hills, gently sloping outwash areas, and extremely flat valley floors. The Crescent Sand Dunes area northwest of Tonopah is a classic dune landform.

Vegetation, Color, and Water

Minimal variety of vegetation and color exists within the valley floors. Moderate variety of vegetation and color is apparent within the mountain areas. Three water bodies exist within the upper and lower valley floors. The most prominent of these is the large water feature within the Alkali Flat.

Cultural Modifications

The Upper Big Smoky Valley is almost free from aesthetically undesirable influences, particularly the areas of Class A Scenery west and east of Route 376. The area below Round Mountain is somewhat depreciated by disharmonious intrusions. However, the Lower Big Smoky Valley contains extensive levels of modifications. Transmission lines, roads, mining exploration areas, and the outskirts of Tonopah are dominant features in the landscape.

Viewer Sensitivity

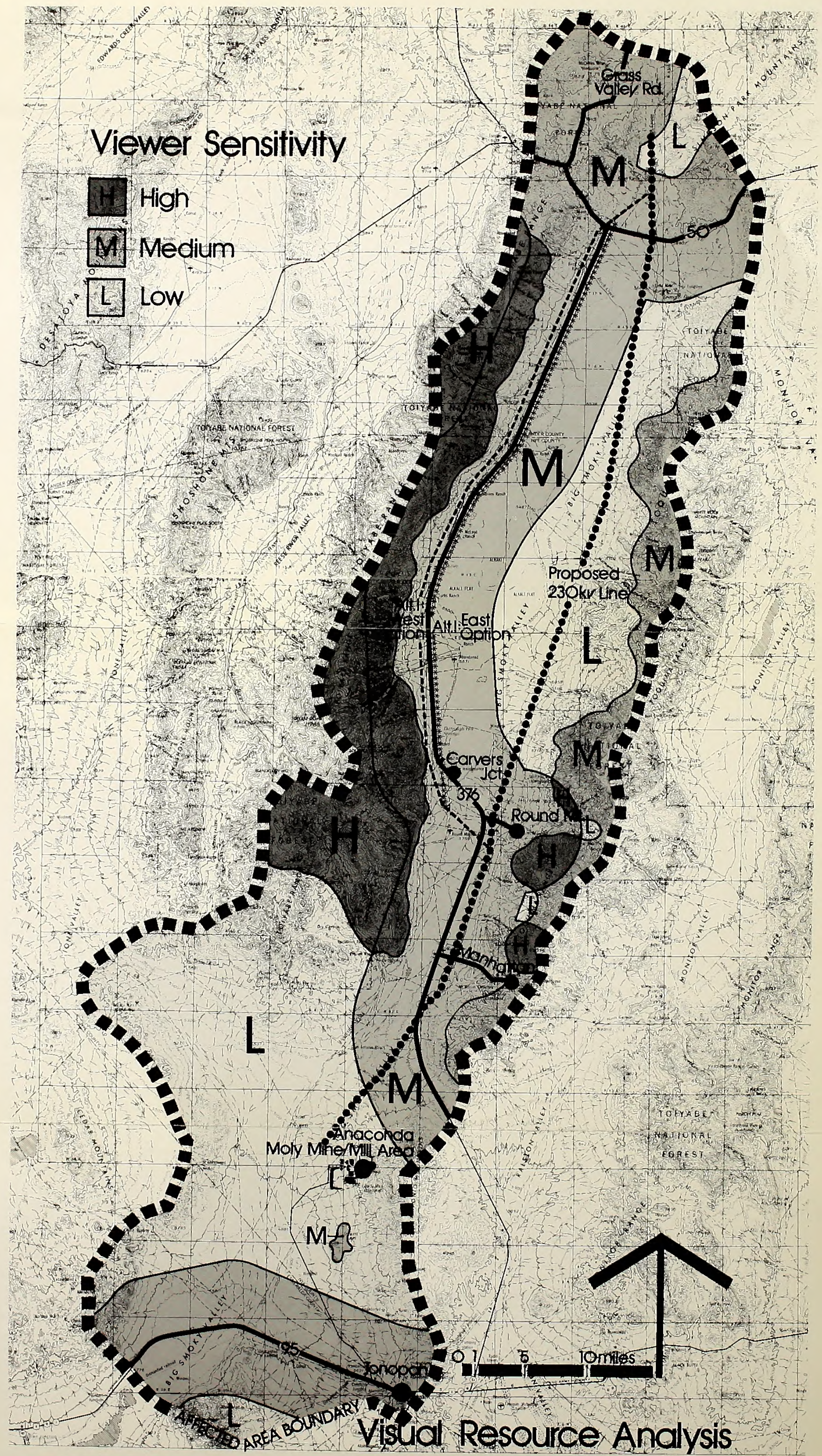
A BLM interdisciplinary group (visual resource specialist, geologist, wildlife biologist, range conservationist, wilderness specialist, and recreation planner) made judgments (Figure 6-21, Appendix B) regarding attitudes of residents and visitors toward visual change in the Study Area. The accompanying Viewer Sensitivity Map (Figure 2-6) demonstrates the combination of Use Volume and User Attitudes (Figure 6-22, Appendix B).

Distance Zones

The accompanying Distance Zones Map (Figure 2-7) shows the proximity of all land areas to Key Observation Points within the Study Area. Foreground-Middleground and Background proximities dominate, while no relevant Seldom-Seen Zones exist in this area.

Visual Resource Management Classes

Five VRM classes have been established by the BLM to provide guidance in ascertaining the degree of modification acceptable to the landscape affected by proposed management activities (Table 2-2).



Visual Resource Analysis

ANACONDA NEVADA MOLY PROJECT

Big Smoky Valley, Nevada

Figure 2-6.

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Denver, Colorado

Prepared by: ERT
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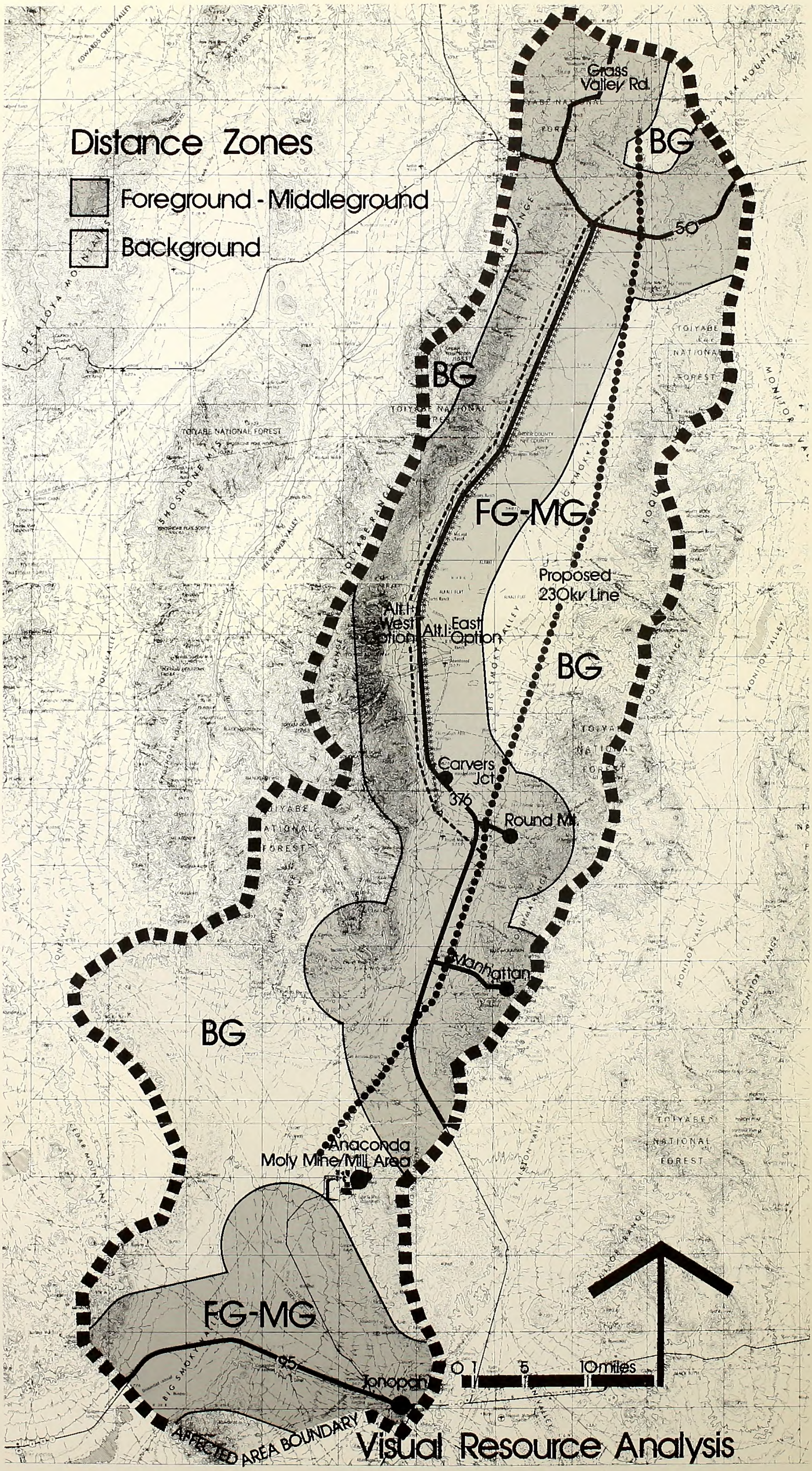

Visual Resource Analysis

ANACONDA NEVADA MOLY PROJECT

Big Smoky Valley, Nevada

Prepared for: Anaconda Copper Co.
Denver, Colorado

Prepared by: ERT
Fort Collins, Colorado

Figure 2-7.

TABLE 2-2

VISUAL RESOURCE MANAGEMENT CLASSES

Class I. This class provides primarily for natural ecological changes; however, it does not preclude very limited management activity. Any contrast created within the characteristic environment must not attract attention. It is applied to wilderness areas, some natural areas, wild portions of the wild and scenic rivers, and other similar situations where management activities are to be restricted.

Areas of Critical Environmental Concern for Scenic Values. The ACEC for scenic values are lands of high scenic value of relative scarcity. For this reason, priority identification must be made for presentation in the management framework process. Conformance with VRM Class II objectives constitutes interim management.

Class II.* Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. A contrast may be seen but should not attract attention.

Class III.* Contrasts to the basic elements (form, line, color, texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.

Class IV.* Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, texture) inherent in the characteristic landscape.

Class V. Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement, i.e., add acceptable visual variety to an area/site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

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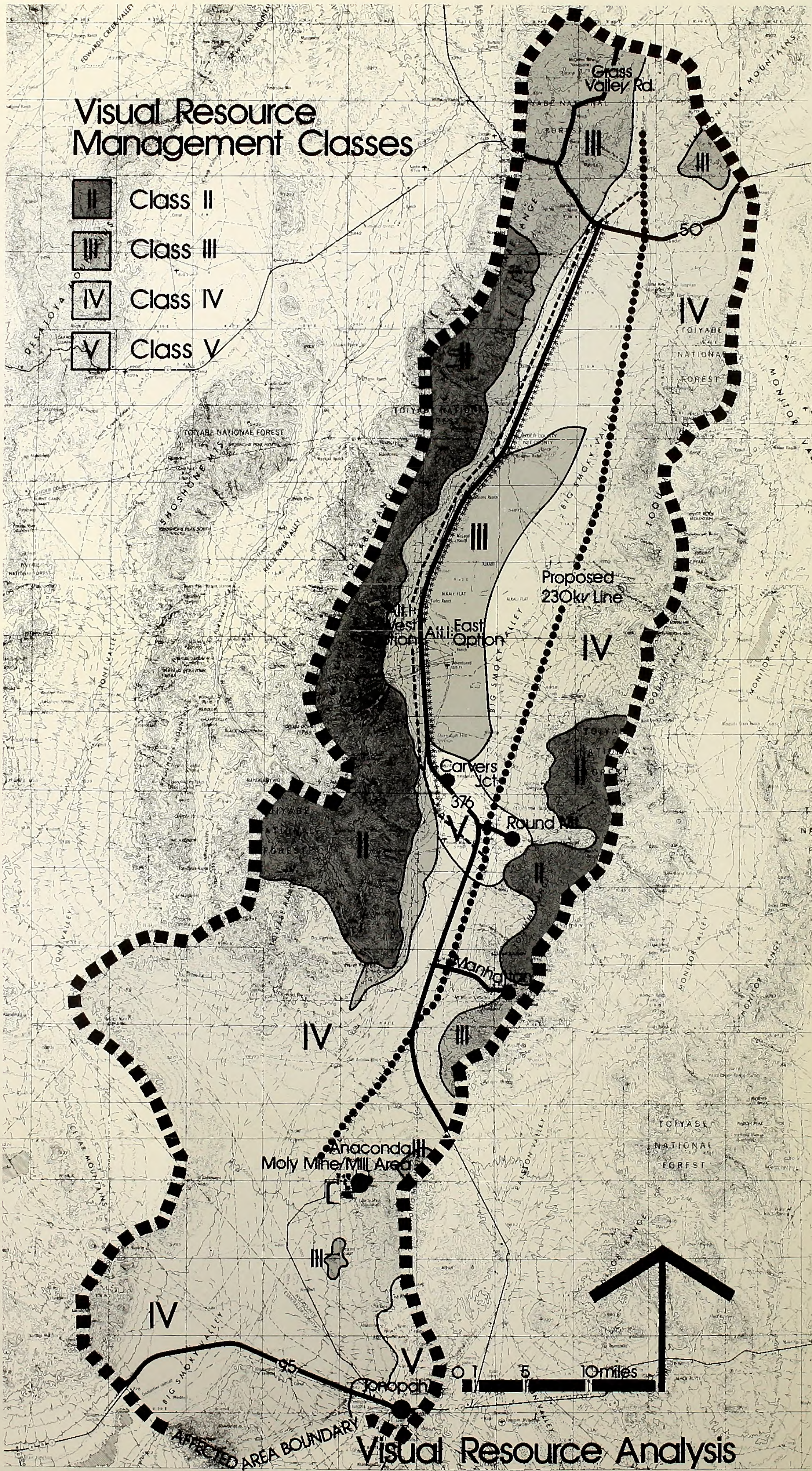
*Structures located in the foreground distance zone (0-1/2 mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be expecially true when a distinctive architectural motif or style is designed. Approval by the District Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards, and, if not, whether they add acceptable visual variety to the landscape.

Four VRM classes exist in the Study Area. These include: (1) Class II, within the Toiyabe Range and the Mount Jefferson Area of the Toquima Range; (2) Class III, within the Crescent Sand Dunes, the area adjacent to central portions of Route 376, and scattered mountain areas within the Upper Big Smoky Valley; (3) Class IV, in low lying areas within the upper and lower valley floors, and dispersed adjacent mountain areas; and (4) Class V, within the Carver's Junction and Tonopah areas. The accompanying Visual Resource Management Classes Map (Figure 2-8) demonstrates Management Class areas.



ANACONDA NEVADA MOLY PROJECT

Big Smoky Valley, Nevada

Prepared for: Anaconda Copper Co.
Denver, Colorado

Prepared by: ERT
Fort Collins, Colorado

Figure 2-8.

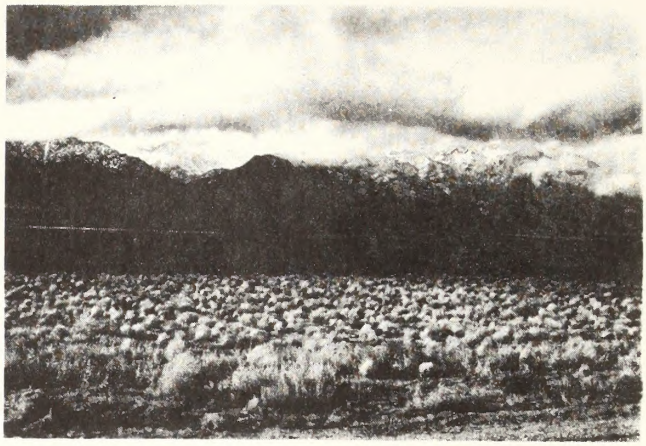
SUMMARY

Sixteen BLM Scenery Quality Rating Units were identified by the BLM Battle Mountain District for the Study Area. These units correspond to contiguous portions of the landscape that display similar landforms. Figure 2-9 shows photographically the visual characteristics of the project area.

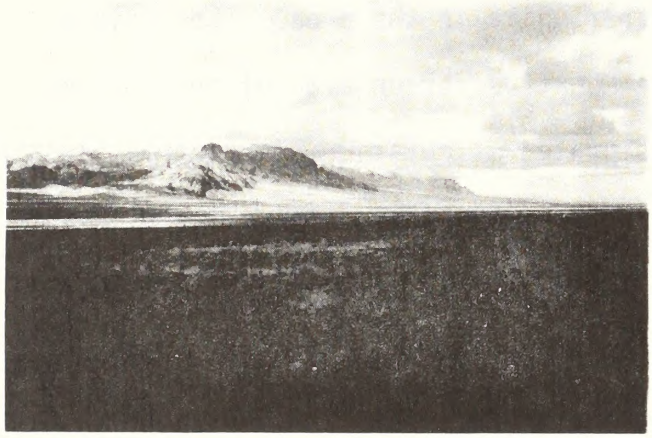
Values (A, B, or C) were assigned to each unit based upon the scenic quality of the unit in relation to other units in the area. The Toiyabe Mountains west of Highway 376 and the Mount Jefferson area of the Toquima Range east of Round Mountain were designated as outstanding scenery (Class A). The alluvial area east and south of the Toiyabe Range, the northern Toiyabe Range, the Alkali Flat adjacent to Highway 376, the Simpson Park Mountains, the San Antonio Mountains, the Crescent Sand Dunes, and the north and south Toquima Range were designated as moderately high quality scenery (Class B). The remaining Big Smoky Valley floor was designated the lowest relative quality scenery (Class C).

Four VRM classes (II, III, IV, and V) exist in the Study Area. The mine/mill complex and the majority of the length of the proposed 230 KV transmission line would be located in VRM Class IV areas. Alternative 1, the West Smoky Valley alternate location for the transmission line corridor, presents two options for placement of the transmission line: (1) the west side of Highway 376, and (2) the east side of Highway 376. On either side of the highway, the transmission line would be located primarily in Class III and IV areas.

The Toiyabe Range



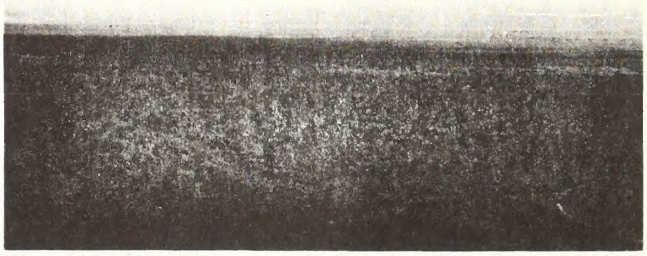
The Toiyabe Range W/Snow



The Arc Dome Area

The Upper Big Smoky Valley

The Mine/Mill Site



The Lower Big Smoky Valley

Photographs of the Study Area

Figure 2-9.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

EVALUATION CRITERIA AND ASSUMPTIONS

The Bureau of Land Management's Visual Resource Management System is used to assess the visual consequences of the Proposed Action and Alternatives. The degree to which the Mine/Mill Complex and Transmission Line adversely affect the visual quality of the landscape depends upon the amount of visual contrast that is created by the activity in relation to the existing landscape character. The amount of contrast between the proposed activity and the existing landscape character can be measured by separating the landscape into its major features (landform, vegetation, and structures), and then predicting the magnitude of change in contrast of each of the basic visual elements (form, line, color, and texture) to each of the features. The assessment of amounts of contrast caused by proposals in this manner indicates the severity of impact and serves as a guide in the effort to reduce impacts to conform to BLM Management Class restrictions.

It is assumed that the construction, use, and removal of the Mine/Mill Complex and Transmission Line would be undertaken and completed as indicated in Chapter 1 of the EIS (ERT, 1980). It is further assumed that standard operating procedures include conscious efforts to minimize and concentrate disruption of the landscape.

EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES

Mine/Mill Complex

The proposed plot plan for the mine/mill complex includes the following facilities: open pit mine, mill facilities; waste disposal areas; tailings dam and pond; soils stockpile; and various auxiliary facilities including offices, storage buildings, roads, and power distribution lines. Estimated surface disturbances for the various subcomponents of the complex are summarized in Table 1-1 of the EIS (ERT, 1980).

The general purpose of each of these facilities relates directly to the flow of the molybdenum extraction and concentration process. The open pit mine (456 acres) would be the source of approximately 20,000 metric tons of ore and 80,000 metric tons of waste rock per day for 20 years. Waste rock would be stored in the four waste disposal areas (980 acres) adjacent to the pit. The ore would be crushed, stored in ore storage areas, and then transported through the mill where the molybdenite (MoS_2) and copper products would be extracted, concentrated, and packed for shipping. Waste from the mill process would be stored in the tailings pond. Molybdenum concentrate would be packaged in 55-gallon drums and shipped by truck to market. Copper concentrate would be packed in bulk and shipped by truck. Supplies, employees, and equipment would all enter the project site via the access road. Power would be supplied via the proposed 230 KV transmission line. Various buildings would be used as offices, control facilities, and equipment storage areas.

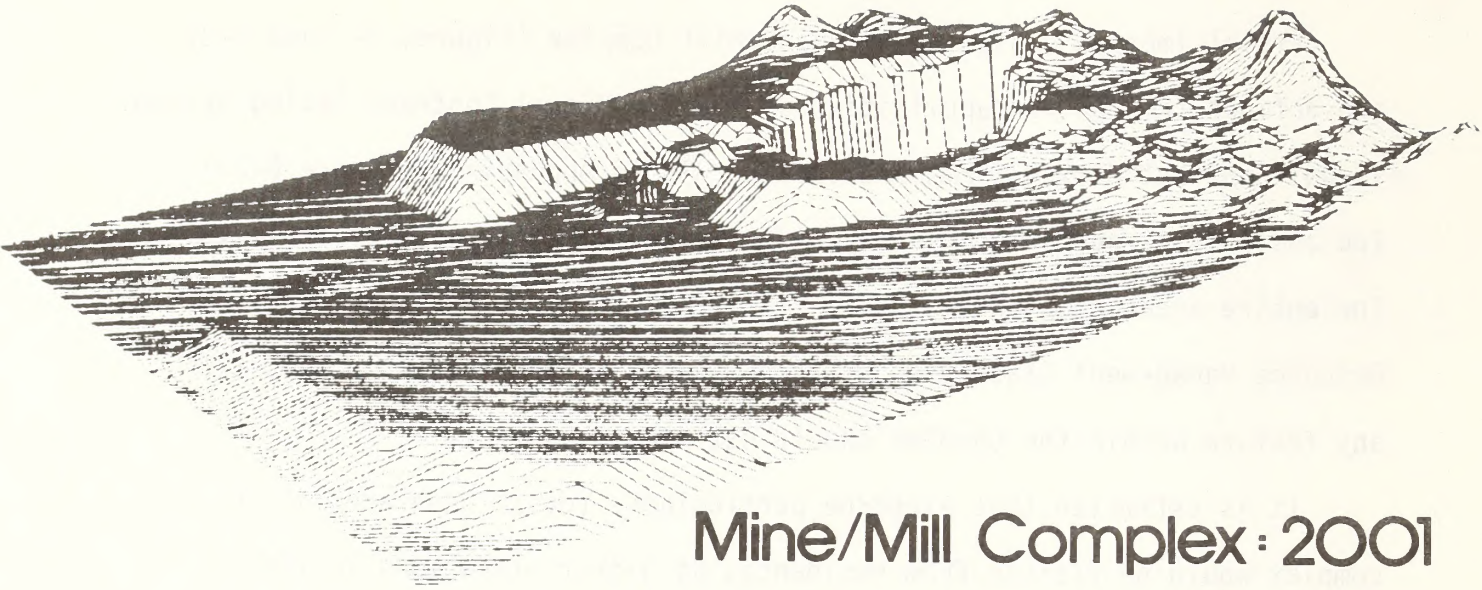
Impacts

Visual impacts caused by the Mine/Mill Complex (Figures 3-1 and 3-2) are defined through the application of the BLM Visual Contrast Rating System. Visual Contrast Rating forms are located within Appendix B (Figure 6-24). The analysis is performed from a point 3 miles directly west of the site. The entire area occupied by the Mine/Mill Complex is classified as Visual Resource Management Class IV. As such, the quantified visual contrast of any feature within the Complex should not exceed 20.

It is estimated that airborne particulates (dust) generated at the complex would be visible from residences at higher elevations in Tonopah. It is not expected that landforms or structures would be visible from Tonopah. However, structures and landforms would be visible out to 25 miles within the southern portion of the Study Area in the area of Route 95.

Visual Contrasts/Landforms. It is estimated that form and color related contrasts caused by the proposed tailings disposal dam, waste storage areas, mine pit, and temporary ore storage piles would be strong (form-12 and color-6). Line and texture related contrasts are considered moderate (line-6 and texture-2). The total contrast for proposed landforms is 26, which exceeds the allowable contrast (20) for BLM Class IV areas. The maximum contrasts are caused by the color of the earth on the visible areas of the landforms in relation to the surrounding landscape.

Visual Contrasts/Vegetation. Line, color, and texture related contrasts caused by modification of vegetation patterns are considered moderate (line-6, color-4, and texture-2). Form related contrasts are weak (4). The total contrast caused by vegetation manipulation is 16, which is allowed within BLM Class IV areas. The maximum contrast is caused by the color of



VIEW FROM SOUTHWEST AT 1500 FEET

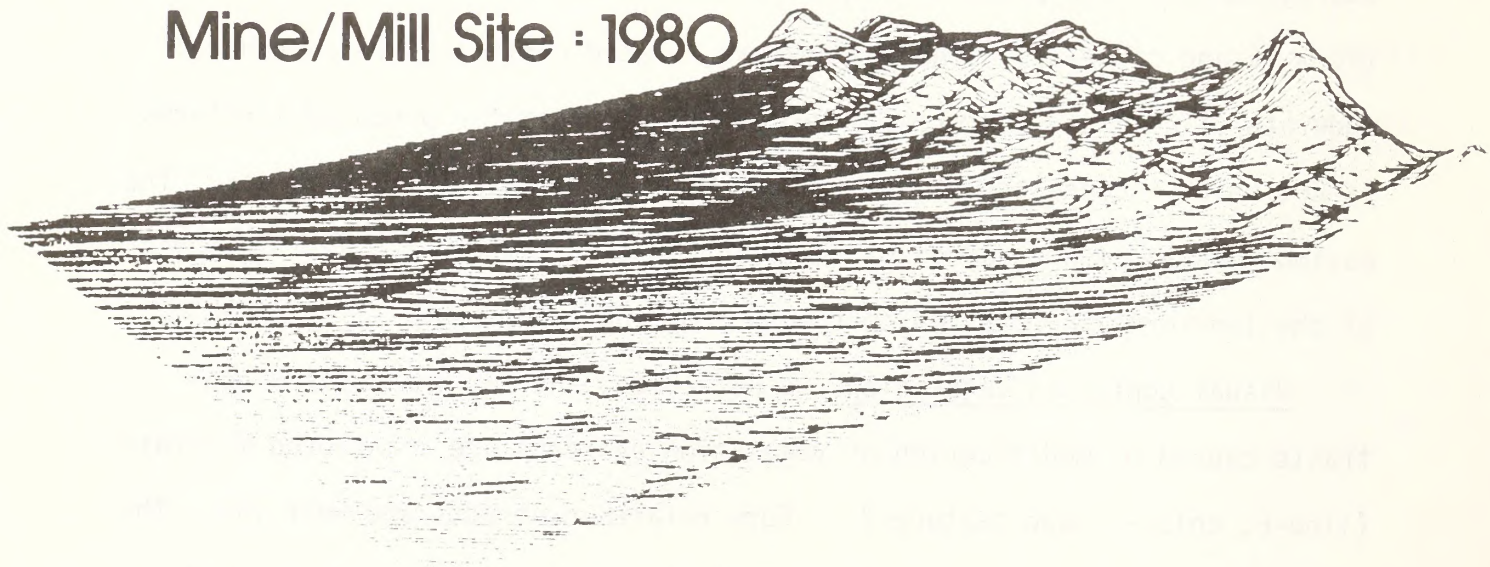
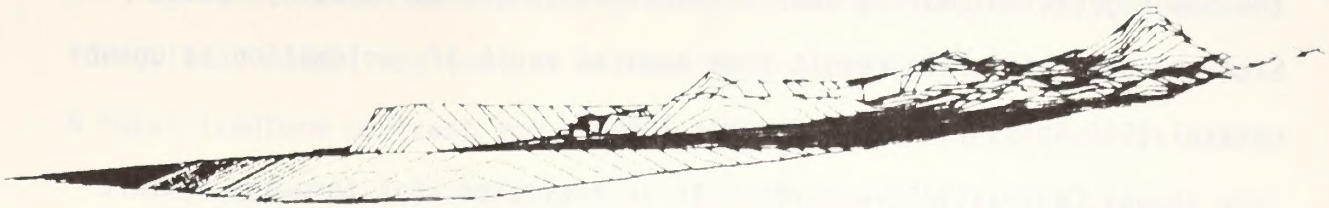


Figure 3-1.



Mine/Mill Complex : 2001

VIEW FROM SOUTHWEST AT GROUND LEVEL

Mine/Mill Site : 1980

Mine/Mill Complex : 2001

VIEW FROM WEST AT GROUND LEVEL

Mine/Mill Site : 1980

Figure 3-2.

the new vegetation (dark green) in relation to the surrounding landscape. Similar contrasts would result from exposed earth if reclamation is unsuccessful (ERT Soils Technical Report, 1980).

Visual Contrasts/Structures. It is estimated that form and texture related contrasts caused by the proposed buildings and structures would be moderate (form-8, texture-2). Line and color related contrasts are estimated to be weak (line-3, color-2). The total contrast for proposed structures is 15, which falls within BLM restrictions for Class IV areas (20). The maximum contrasts are caused by the form of the proposed structures (block) in relation to the forms of the surrounding landscape (planar and angular).

Recommended Mitigation Measures

The BLM Visual Contrast Rating System is used to identify appropriate visual impact mitigation measures. It is assumed that measures identified through application of the Contrast Rating System from a point 3 miles directly west of the site would mitigate visual impacts from all remaining areas within which the Mine/Mill Complex is visible.

The maximum element contrast caused by the proposed Mine/Mill Complex is related to color. It is estimated that a reduction of color contrasts will cause a resultant reduction of form and line related contrasts.

Mitigation Measures/Landform. Establishment of grass and shrub vegetation on visible slopes would reduce color contrasts substantially. Grading of earthforms to conform to the surrounding smoothly rounded terrain would further reduce form and line related contrasts. Terraces should be graded evenly to reduce shade patterns and resultant tonal contrasts.

It is estimated that proper grading of new earthforms would reduce form, line, color, and texture related contrasts to a total score of 15. A total landform contrast score of 15 is acceptable in BLM Class IV areas.

Mitigation Measures/Vegetation. Establishment of native grasses and shrubs, which are similar to indigenous species, on new landforms and disturbed areas would reduce color and texture contrasts further to a total score of 11. A total vegetation contrast score of 11 is acceptable in a BLM Class IV area.

Mitigation Measures/Structures. The structures, as proposed, meet BLM restrictions for Class IV areas.

Unavoidable Adverse Impacts

Visual impacts caused by the tailings and waste disposal areas and the mine pit in very short range viewing situations (nearer than 1 mile) are unavoidable. The establishment of vegetation would not mitigate form and line related impacts in near distance views. The presence of dust caused by processing and road travel would also cause visual impacts.

230 KV Transmission Line

The proposed electric transmission system would consist of a switching station located on public land and 230 KV transmission line crossing 86 miles of public land connecting to a substation on ACC property. The switching station would require approximately 4 acres of land, and the transmission line right-of-way would be 104 feet wide for a total area of 1,459 acres. The terrain on which the facilities would be constructed is relatively flat and there would be no areas in which construction would be difficult.

The color of materials used in the construction of the switching station would be in the light grey to tan color range, subject to final approval by the BLM. However, transmission line structures would be H-frames constructed of wood poles treated with pentachlorophenol in heavy petroleum oil, which is dark brown. The support structures would consist of two upright poles approximately 20 feet apart with steel cross arms forming the "H" and X-bracing for additional strength where required. Poles would average 80 feet in length and be set approximately 10 feet in the ground. The poles would be situated on the terrain to maintain a minimum design clearance of 36 feet between the conductors and the ground surface. Towers would be situated approximately 850 feet apart or approximately 6 per mile for a total of 534.

Conductors would be 795 Mcm nonspecular aluminum conductor-steel reinforced cable. Insulators would be suspension type consisting of 10-inch diameter porcelain dishes painted sky gray. The dishes would be arranged vertically with 15 dishes per line. Static lines would be 3/8-inch non-specular galvanized steel.

Impacts

Visual impacts caused by the proposed 230 KV Transmission Line are defined through the application of BLM's Visual Contrast Rating System. Visual Contrast Rating forms are located within Appendix B (Figure 6-25). The visual impact analyses are performed from the intersection of Route 50 and the proposed Line and from Route 376 south of Round Mountain. The proposed Line would be highly visible from these locations, seen only intermittently from other observation locations, and nearly invisible from most of Route 376.

The proposed Line would cross approximately 80 miles of BLM Visual Resource Management Class IV area and approximately 6 miles of Class V area.

Visual Contrasts/Landform. Line and color related contrasts which would be caused by proposed construction and maintenance roads are estimated to be weak (line-3, color-2). No form or texture related contrasts would be apparent. The total contrast for proposed landforms is 5, which falls easily within BLM Class IV (20) contrast restrictions.

Visual Contrasts/Vegetation. Line, color, and texture related contrasts which would be caused by the disturbance of vegetation along the proposed route are estimated to be weak (line-3, color-2, and texture-1). No form related contrasts would be apparent. The total contrast for proposed vegetation patterns is 6, which falls easily within BLM Class IV restrictions.

Visual Contrasts/Structures. Form and line related contrasts caused by the proposed structures are estimated to be moderate (form-8, line-6). Color contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast caused by the proposed structures is 20, which meets BLM restrictions for Class IV areas. However, it is estimated that impacts would be significant in the areas of major highway crossings, due to the high level of visibility.

Recommended Mitigation Measures

The revegetation of disturbed areas would provide adequate mitigation of visual contrasts related to ground areas along the proposed transmission line route. Placement of poles as near as possible to existing poles would

decrease visibility and resultant visual contrast. The use of Western Red Cedar poles within 1.5 miles of Routes 50 and 376 would reduce color contrasts from strong to weak.

Unavoidable Adverse Impacts

Unavoidable visual impacts would not be caused by the proposed 230 KV Transmission Line, if recommended mitigation measures are implemented.

The strong color-related contrasts caused by the pentachlorophenol-treated Douglas Fir poles and metal cross braces would cause significant visual impacts for an area approximately 25 miles long which is within 1.5 miles of Routes 50 and 376. The visual impacts would be mitigated by using Western Red Cedar poles and cross braces. These poles would reduce the contrast to a level which falls within BLM Class III and Class IV restrictions.

There would be significant adverse visual impacts at the mine/mill site. The landform contrast associated with construction of the mine/mill would exceed the allowable contrast values for a VRM Class IV area. The construction of the transmission line would represent a visual intrusion for those individuals in the Big Smoky Valley. However, the contrast values would be within restrictions for BLM Class IV and V areas and, after mitigation, would not significantly affect visual resources.

Switching Station Facility

Impacts

The BLM Visual Contrast Rating System is applied to the switching station from the ridge directly south of the site. The proposed switching

station would be located within a BLM Class IV area. Visual Contrast Rating forms are located within Appendix B (Figure 6-26).

Visual Contrasts/Landform. Color related contrasts which would be caused by the switching station landform are estimated to be moderate (4). Form and line related contrasts would be weak (form-4, line-3). No texture related contrasts would be apparent. A total contrast of 11 falls within BLM Class IV (20) restrictions.

Visual Contrasts/Vegetation. Color related contrasts which would be caused by the switching station vegetation are estimated to be moderate (4). Line related contrasts would be weak (3). No form or texture contrasts would be apparent. A total contrast of 7 falls within BLM Class IV restrictions (20).

Visual Contrasts/Structures. Color related contrasts which would be caused by the switching station structures are estimated to be strong (6). Form and line related contrasts would be moderate (form-8, line-6). No texture related contrasts would be apparent. A total contrast of 20 meets BLM Class IV (20) restrictions. It is estimated that visual impacts caused by the switching station would be insignificant, due to the low level of visibility in the area.

Recommended Mitigation Measures

The revegetation of disturbed areas would provide adequate mitigation of visual contrasts related to ground areas within the site.

Unavoidable Adverse Impacts

Unavoidable adverse impacts would not be caused by the switching station facility.

Alternative 1-West Side Option/230 KV Transmission Line

Impacts

Impacts to visual resources affected by the West Smoky Valley Alternative would depend upon whether the transmission line were constructed on the west side or east side of Route 376. Separate impact analyses were conducted for the two options because either side of the highway could potentially be selected.

Visual impacts caused by the construction of the West Side Option would be very significant. The high level of significance is due to its location within the view from Routes 50 and 376, and the Carver's Junction area to the scenic Toiyabe Mountains. Although BLM Visual Resource Management Guidelines require that allowable visual contrasts stem from the VRM class upon which the transmission line is built, it is clear that people generally look over the narrow VRM Class III area to the VRM Class II area (Toiyabe Mountains) to the immediate west.

Visual impacts which would be caused by the transmission line on the west side of Route 376 are defined by application of the BLM Visual Contrast Rating System from the intersection of Routes 50 and 376, and from the parking area across the road from Carver's Junction. Visual Contrast Rating forms are located within Appendix B (Figure 6-27). The West Side Option would be very highly visible from Route 50, Route 376, and the Carver's Junction/Round Mountain area.

The West Side Option would cross approximately 36 miles of BLM Visual Resource Management Class III area, 48 miles of Class IV area, and 13 miles of Class V area.

Visual Contrasts/Landform. Line related contrasts which would be caused by the proposed construction and maintenance roads are estimated to be moderate (line-6). Color related contrasts are expected to be weak (color-2). No form or texture contrasts would be apparent. The total contrast for proposed landforms is 8, which falls within BLM's Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Vegetation. Line related contrasts which would be caused by the disturbance of vegetation would be moderate (line-6). Texture related contrasts would be weak (texture-1), and no color or form related contrasts would be apparent. The total contrast for proposed vegetation is 7, which falls within BLM's Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Structures. Form and line related contrasts which would be caused by the transmission structures and conductors are estimated to be moderate (form-8, line-6). Color related contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast for proposed structures is 20, which exceeds BLM Class III (16) restrictions, and equals the Class IV (20) restrictions.

Recommended Mitigation Measures

The revegetation of disturbed areas would provide adequate mitigation of visual contrasts related to ground areas along the route. The use of Western Red Cedar poles (lt. grey/tan color) within 1.5 miles of Routes 50 and 376 would reduce color contrasts from strong to weak. Placement of poles as near as possible to existing poles would also help to decrease color contrasts. However, form and line related contrasts would still be

moderate (form-8, line-6). A total contrast of 14 still exceeds the BLM Class II (12) restrictions of the Toiyabe Mountains.

Unavoidable Adverse Impacts

For the West Smoky Valley Alternative, visual contrasts would result from the transmission line structures. If the line were constructed west of Highway 376, visual contrasts would be significant and exceed the BLM restrictions for existing Visual Resource Management Class III, and would also result in significant impacts in the area within 1.5 miles of route 376. In addition, construction of the transmission line in the west corridor would adversely affect the Class II area directly to the west of the corridor and these indirect impacts would be considered significant.

Alternative 1-East Side Option/230 KV Transmission Line

Impacts

Visual impacts caused by the East Side Option are defined by application of the BLM Visual Contrast Rating System from Nevada Route 376 near the Alkali Flat. Visual Contrast Rating forms are located within Appendix B (Figure 6-28). Although located directly adjacent to Route 376, it is assumed that most people direct their views west to the mountains, away from the transmission corridor. As such, a transmission line would be generally less visible on the east side of the road than on the west. However, the highway alignment in the first 15 miles north of Carver's Junction would cause the viewer to perceive the East Side Option within the view to the Toiyabes.

This option would cross approximately 23 miles of BLM Visual Resource Management Class III area, approximately 55 miles of Class IV area, and 13 miles of Class V area.

Visual Contrasts/Landform. Line and color related contrasts which would be caused by proposed construction and maintenance roads are estimated to be weak (line-3, color-2). No form or texture related contrasts would be apparent. The total contrast for proposed landforms is 5, which falls easily within BLM Class III (16) and Class II (12) restrictions.

Visual Contrasts/Vegetation. Line, color, and texture related contrasts which would be caused by the disturbance of vegetation are estimated to be weak (line-3, color-2, and texture-1). No form related contrasts would be apparent. The total contrast for vegetation disturbance is 6, which falls easily within BLM Class III (16) and Class II (12) restrictions.

Visual Contrasts/Structures. Form and line related contrasts caused by the structures and conductors are estimated to be moderate (form-8, line-6). Color contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast which would be caused by the East Side Option is 20, which falls within BLM's Class IV (20) and Class V restrictions, and exceeds BLM's Class III (16) and Class II (12) restrictions.

Recommended Mitigation Measures

The revegetation of disturbed areas would provide adequate mitigation of visual contrasts related to ground areas along the corridor. The use of Western Red Cedar poles (lt. grey/tan color) within 1.5 miles of Routes 50 and 376 would reduce color contrasts from strong to weak.

Unavoidable Adverse Impacts

Unavoidable adverse visual impacts would not be caused by the majority of the East Side Option with the inclusion of the above mitigation measures. However, the section of line within the first 15 miles north of Carver's Junction would cause unavoidable adverse visual impacts, due to its impact upon the view of the Toiyabe Mountains.

230 KV Transmission Structure Options/Proposed Route

Impacts

Visual impact analyses are performed upon the following transmission structure options. Structures are shown in Figure 3-3.

Option A - Wood "K"-Frame Tangent Structure

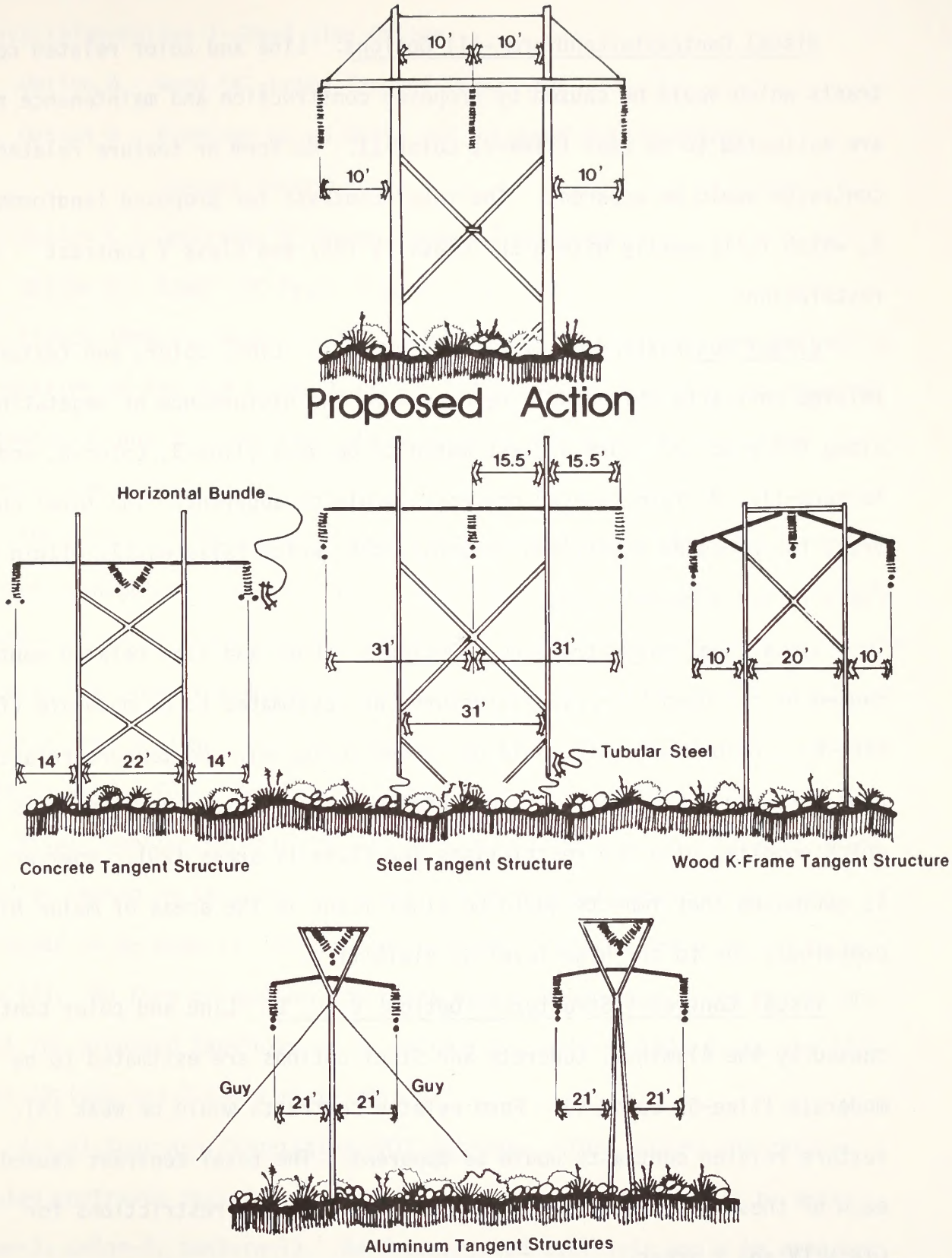
Option B - Aluminum Guyed Delta and 4-Legged Free Standing Tangent Structures

Option C - Concrete "H"-Frame Tangent Structures

Option D - Steel "H"-Frame Tangent Structures

Visual impacts caused by the transmission structure options are defined through the application of BLM's Visual Contrast Rating System. The visual impact analyses are performed from the intersection of Route 50 and the proposed route and from Route 376 south of Round Mountain.

The proposed route would cross approximately 80 miles of BLM Visual Resource Management Class IV area and approximately 6 miles of Class V area. Visual Contrast Rating forms are located within Appendix B (Figure 6-29).



Alternative Transmission Line Support Structures
Source: Sierra Pacific Power Company

Figure 3-3.

Visual Contrasts/Landform--All Options. Line and color related contrasts which would be caused by proposed construction and maintenance roads are estimated to be weak (line-3, color-2). No form or texture related contrasts would be apparent. The total contrast for proposed landforms is 5, which falls easily within BLM Class IV (20) and Class V contrast restrictions.

Visual Contrasts/Vegetation--All Options. Line, color, and texture related contrasts which would be caused by the disturbance of vegetation along the proposed route are estimated to be weak (line-3, color-2, and texture-1). No form related contrasts would be apparent. The total contrast for proposed vegetation patterns is 6, which falls easily within BLM Class IV and V restrictions.

Visual Contrasts/Structures--Option A. Form and line related contrasts caused by the Wood "K"-Frame structures are estimated to be moderate (form-8, line-6). Color contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast caused by Option A is 20, which complies with BLM restrictions for Class IV areas (20). However, it is estimated that impacts would be significant in the areas of major highway crossings, due to the high level of visibility.

Visual Contrasts/Structures--Options B, C, D. Line and color contrasts caused by the Aluminum, Concrete and Steel options are estimated to be moderate (line-6, color-4). Form related contrasts would be weak (4). No texture related contrasts would be apparent. The total contrast caused by each of these options is 14, which complies with BLM restrictions for Class IV and V areas.

Impacts/Alternative 1--West Side Option

Option A - Wood "K"-Frame Tangent Structures

Option B - Aluminum Guyed Delta and 4-Legged Free Standing Tangent Structures

Option C - Concrete "H"-Frame Tangent Structures

Option D - Steel "H"-Frame Tangent Structures

Visual impacts caused by transmission structure options are defined by application of the BLM Visual Contrast Rating System from the intersection of Routes 50 and 376, and from the parking area across the road from Carver's Junction.

The West Side Option would cross approximately 36 miles of BLM Visual Resource Management Class III area, 48 miles of Class IV area, and approximately 7 miles of Class V area. This route would be located directly within the westerly view from Route 50, Route 376, and the Carver's Junction/Round Mountain area to the scenic Toiyabe National Forest mountain range. Visual Contrast Rating forms are located within Appendix B (Figure 6-30).

Visual Contrasts/Landform--All Options. Line related contrasts which would be caused by the proposed construction and maintenance roads are estimated to be moderate (6). Color related contrasts are expected to be weak (2). No form or texture contrasts would be apparent. The total contrast for proposed landforms is 8, which falls within BLM's Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Vegetation--All Options. Line, color, and texture related contrasts caused by the disturbance of vegetation would be weak (line-3, color-2, texture-1). No form related contrasts would be apparent. The total contrast for proposed vegetation patterns is 6, which falls within BLM's Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Structures--Option A. Form and line related contrasts which would be caused by the Wood "K"-Frame option are estimated to be moderate (form-8, line-6). Color related contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast for Option A is 20, which exceeds BLM Class III (16) restrictions, and equals the Class IV (20) restrictions.

Visual Contrasts/Structures--Options B, C, D. Color related contrasts which would be caused by Options B, C, and D are estimated to be strong (6). Form and line contrasts would be moderate (form-8, line-6). No texture related contrasts would be apparent. The total contrast for these options is 20, which exceeds BLM Class III (16) and meets Class IV (20) restrictions. The impacts which would be caused by these options are considered to be significant in this area.

Impacts/Alternative 1--East Side Option

Option A - Wood "K"-Frame Tangent Structures

Option B - Aluminum Guyed Delta and 4-Legged Free Standing Tangent Structures

Option C - Concrete "H"-Frame Tangent Structures

Option D - Steel "H"-Frame Tangent Structures

Visual impacts caused by transmission structure options are defined by application of the BLM Visual Contrast Rating System from Nevada Route 376 near the Alkali Flat. The East Side Option would cross approximately 23 miles of BLM Visual Resource Management Class III area. Visual Contrast Rating forms are located within Appendix B (Figure 6-31).

Visual Contrasts/Landform--All Options. Line and color related contrasts caused by proposed construction and maintenance roads are estimated to be weak (line-3, color-2). No form or texture related contrasts would be apparent. The total contrast for proposed landforms is 5, which falls easily within BLM Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Vegetation--All Options. Line, color, and texture related contrasts caused by the disturbance of vegetation are estimated to be weak (line-3, color-2, and texture-1). No form related contrasts would be apparent. The total contrast for vegetation disturbance is 6, which falls easily within BLM Class III (16), Class IV (20), and Class V restrictions.

Visual Contrasts/Structures--Option A. Form and line related contrasts caused by the Wood "K"-Frame Option are estimated to be moderate (form-8, line-6). Color contrasts would be strong (color-6). No texture related contrasts would be apparent. The total contrast caused by this option is 20, which exceeds BLM's Class III (16) restrictions and meets Class IV (20) restrictions. However, it is estimated that impacts would be significant in areas within 1.5 miles of Routes 50 and 376 due to the strong color contrasts.

Visual Contrasts/Structures--Options B, C, D. Color related contrasts which would be caused by Options B, C, and D are estimated to be strong (6). Line related contrasts would be moderate (6). Form related contrasts would be weak (4). No texture related contrasts would be apparent. The total contrast caused by these options is 16, which meets BLM's Class III (16) restrictions and falls within the Class IV (20) and Class V restrictions.

Unavoidable Adverse Impacts

Unavoidable adverse impacts which would be caused by using the alternate transmission line structures vary with the structure and with the location of the transmission line corridor. All options would result in some visual contrasts due to introduction of the structures into the landscape. None of the options would exceed VRM Class restrictions of the proposed corridor, although the dark colors of the wood K-frame would pose strong contrasts which would be considered significant. All of the options would exceed VRM Class restrictions on the West Smoky Valley Alternative corridor (west side of highway) and would significantly interfere with the view of the scenic Toiyabe Mountains. Three of the four options would meet VRM Class restrictions on the east side of Highway 376 and the fourth would exceed the restrictions. All of the options would still significantly interfere with the view of the Toiyabe Mountains in a 15 mile segment extending north from Carver's Junction.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The short-term use of the Study Area (area from which the Proposed Actions and Alternatives can be seen) for these purposes would change considerably the visual character over the long term. Existing residents and visitors who have experienced its visual characteristics would notice change. New residents and visitors, not accustomed to its present status, need not experience a sense of the occurrence of visual change if contemporary reclamation and clean-up procedures are judiciously implemented.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

At stake is an area classified under BLM guidelines as Visual Resource Management Class IV. Class IV guidelines state that proposed actions "may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, texture) inherent in the characteristic landscape." Class IV is the lowest permanent landscape category within the BLM Visual Resource Management System.

It is estimated that proposed landforms would cause changes which would be economically unreasonable to reverse. Once initiated, the new tailings dam, waste disposal areas, and mine pit would cause indefinitely irreversible change to the visual character of the landscape.

Due to the extreme economic problems associated with landform removal, the existing landscape character is essentially irrecoverable and not readily replaceable.

SUMMARY/PROPOSED ACTION

The Proposed Actions and Alternative Options influence four separate Visual Resource Management Classes within the Study Area. The accompanying Visual Resource Management Class Map (Figure 2 - 8) demonstrates the location of Proposed Actions and Alternative Options with respect to the Visual Resource Management Classes.

Mine/Mill Complex

The construction of the mine/mill complex would impact the visual quality of the project area. It is estimated that the visual contrasts associated with construction of the mine pit, tailings dam and pond, and four waste disposal areas at the mine/mill complex would be significant. These facilities would produce substantial changes from existing topography and would be visible from as far as 25 miles west of the site (see Figures 3-1 and 3-2 for computer simulations of future topography at the mine/mill site). As indicated in Chapter 2, the mine/mill site is located in a Class IV area; the form and color contrasts associated with the new landforms would exceed the allowable contrast for the Class IV areas.

The major causes of the predicted visual contrasts would be differences in the color of the pit, tailings, and waste disposal areas relative to the surrounding vegetation, and differences in their shape and form relative to existing topography. Establishment of vegetation on these areas and grading to blend with existing contours would reduce this visual impact to acceptable levels. However, as indicated in the ERT Soils Technical

Report 1980, the worst-case analysis indicates that revegetation would fail. Therefore, the visual impacts caused by construction of the facilities at the mine/mill complex would be significant (Table 3-1).

230 KV Transmission Line

Construction of the transmission line would represent a visual intrusion for those individuals in the immediate area, but it would not significantly affect the visual resource quality of the entire Big Smoky Valley. There would be color contrasts associated with the dark brown transmission towers superimposed upon the dominantly grey-green landscape. The transmission line would be most visible at the intersection of Route 50 and Highway 376. It would be less visible in the Carver's Junction/Round Mountain area and seen only intermittently from Round Mountain to Route 50. As indicated in Chapter 2, the transmission line would cross approximately 80 miles of land classified as Class IV and 6 miles of land classified as Class V (see Table 2-2 for definition of classes). The visual contrast impacts associated with the transmission line would be within the allowable contrast for Class IV and V areas. However, visual impacts caused by the proposed structures are estimated to be significant in the areas within 1.5 miles of Routes 50 and 376 due to the discordance of color. This would represent a significant impact for an approximate 25-mile distance. With the exception of the 25-mile stretch, the visual impacts for the majority of line would not be significant.

Alternative 1/230 KV Transmission Line

Impacts to visual resources of the West Smoky Valley Alternative would depend on whether the transmission line is constructed on the west side

TABLE 3-1

IMPACT SUMMARY FOR MINE/MILL COMPLEX

	Landforms	Vegetation	Structures
Visual Contrasts	Strong (26)	Moderate (16)	Moderate (15)

of Highway 376 or on the east side. Separate impact analyses were conducted for the two options because either side of the highway could potentially be selected.

The visual impact analyses for the West Side Option were performed from the intersection of Route 50 and the transmission line, and from the parking area across the highway from Carver's Junction. Visual contrasts caused by the construction of the transmission line on the West Side Option would be very significant. The high level of significance is due to its location within the view from Route 50, Highway 376, and the Carver's Junction area to the scenic Toiyabe Mountains. Although BLM Visual Resource Management guidelines require that allowable visual contrasts are dictated by the VRM class upon which the transmission line is built, it is clear that people generally look over the narrow VRM Class III area to the VRM Class II area (Toiyabe Mountains) to the immediate west. As such, the level of contrast influences an area in which development should not be evident or attract attention in the characteristic landscape.

The West Side Option would cross approximately 36 miles of land classified as VRM Class III, 48 miles of land classified as VRM Class IV, and 13 miles of land classified as VRM Class V (see Table 2-2 for definition of classes). The visual contrast impacts associated with the transmission line on the west side would exceed VRM Class III restrictions and would be within the allowable contrasts for VRM Class IV and V. The visual impacts which would be caused by the transmission structures in the area within 1.5 miles of Route 376 would be significant due to the discordance of colors. Therefore, the visual impacts for the majority of the line would be significant.

Visual impact analyses for the east side of the highway were performed from a point along Highway 376 near the Alkali Flat. It was assumed that most people traveling Highway 376 direct their views to the scenic Toiyabe Mountains to the west. However, there is a stretch of Highway 376 (extending approximately 15 miles north of Carver's Junction) where the highway is directly in front of the Toiyabe Mountains and the view of the Toiyabe Mountains (Class II) is the same on the east side as well as on the west side of Highway 376. With the exception of the 15-mile stretch, a transmission line would be generally less visible on the east side of the highway than on the west. See Appendix B for comparative analysis of visual impacts associated with construction of the line on the east or west side of the highway.

As indicated in Chapter 2, the transmission line on the east side of the highway would cross approximately 23 miles of land classified as VRM Class III, 13 miles of land classified as VRM Class V, and 55 miles of land classified as VRM Class IV. The total contrast for transmission line structures would exceed VRM Class III restrictions and meet Class IV restrictions. Additional significant visual impacts would be caused by the transmission structures in the area within 1.5 miles of Route 376; therefore, the visual impacts for the east side would be significant for the majority of the line.

Construction of the transmission line would cause significant visual impacts along Highway 387 in the Alkali Flat area and at the Route 50 crossing. The visual contrast impacts associated with the transmission line on the east side would exceed restrictions for VRM Class III, but would be within the allowable contrast for VRM Class IV and Class V areas.

In addition, the transmission line constructed in the west side corridor would be directly within the view of the Toiyabe Mountains (Class II) for a distance of approximately 60 miles. If the transmission line were constructed in the east side corridor, it would be directly within the view of the Toiyabe Mountains (Class II) for a distance of approximately 15 miles. Therefore, construction of the line in either corridor would significantly indirectly affect the VRM Class II area.

Transmission Structure Options

Tables 3-2 through 3-6 on the following pages summarize the visual impacts of the various alternate transmission line structures on all possible corridor alignments. In general, options B, C, and D would pose relatively less severe visual contrasts because their colors would be in greater harmony with the natural tans and greys of the existing landscape. The dark color of the treated wood poles used for the proposed structures and for Option A would strongly contrast with the existing colors in the landscape.

For the proposed corridor, visual contrast ratings for all of the options fall at or below restrictions for Class IV and V Visual Resource Management (VRM) Classes. Option A, the wood, K-frame would have identical effects as the proposed wood H-frame structure, and similar mitigation measures would be needed to reduce strong contrast ratings resulting from the discordant color of the dark brown poles.

For the West Smoky Valley Alternative corridor, assuming line location on the west side of Highway 376, all of the options would exceed BLM restrictions for Class III areas. In addition, all of the options would be located directly within the view of the scenic Toiyabe Mountains

TABLE 3-2

SUMMARY OF VISUAL IMPACTS OF THE PROPOSED TRANSMISSION LINE STRUCTURES AND FOR ALL ALTERNATE LINE LOCATIONS

	Rating	VRM Class III	VRM Class IV	VRM Class V
PROPOSED CORRIDOR		-	80 miles	6 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	20			
WEST SMOKY ALTERNATIVE (West of Highway 376)		36 miles	48 miles	7 miles
Contrasts				
Landform	8			
Vegetation	6			
Structures	20[a]			
WEST SMOKY ALTERNATIVE (East of Highway 376)		23 miles	55 miles	13 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	20[a]			

MAXIMUM ALLOWABLE CONTRAST: VRM Class III - 16
VRM Class IV - 20
VRM Class V - No maximum allowable contrast

[a]Exceeds BLM restrictions for one or more BLM VRM Class on the specific route.

TABLE 3-3

SUMMARY OF VISUAL IMPACTS OF THE ALTERNATE WOOD "K"- FRAME TRANSMISSION LINE STRUCTURES FOR ALL ALTERNATE LINE LOCATIONS

	Rating	VRM Class III	VRM Class IV	VRM Class V
PROPOSED CORRIDOR		-	80 miles	6 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	20			
WEST SMOKY ALTERNATIVE (West of Highway 376)		36 miles	48 miles	7 miles
Contrasts				
Landform	8			
Vegetation	6			
Structures	20[a]			
WEST SMOKY ALTERNATIVE (East of Highway 376)		23 miles	55 miles	13 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	20[a]			

MAXIMUM ALLOWABLE CONTRAST: VRM Class III - 16
VRM Class IV - 20
VRM Class V - No maximum allowable contrast

[a]Exceeds BLM restrictions for one or more BLM VRM Class on the specific route.

TABLE 3-4

SUMMARY OF VISUAL IMPACTS OF THE ALTERNATE ALUMINUM GUYED DELTA AND 4-LEGGED FREE STANDING TANGENT TRANSMISSION LINE STRUCTURES FOR ALL ALTERNATE LINE LOCATIONS

	Rating	VRM Class III	VRM Class IV	VRM Class V
PROPOSED CORRIDOR		-	80 miles	6 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	14			
WEST SMOKY ALTERNATIVE (West of Highway 376)		36 miles	48 miles	7 miles
Contrasts				
Landform	8			
Vegetation	6			
Structures	20[a]			
WEST SMOKY ALTERNATIVE (East of Highway 376)		23 miles	55 miles	13 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	16			

MAXIMUM ALLOWABLE CONTRAST:
VRM Class III - 16
VRM Class IV - 20
VRM Class v - No maximum allowable contrast

[a]Exceeds BLM restrictions for one or more BLM VRM Class on the specific route.

TABLE 3-5

SUMMARY OF VISUAL IMPACTS OF THE ALTERNATE CONCRETE "H"-FRAME TANGENT TRANSMISSION LINE STRUCTURES FOR ALL ALTERNATE LINE LOCATIONS

	Rating	VRM Class III	VRM Class IV	VRM Class V
PROPOSED CORRIDOR		-	80 miles	6 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	14			
WEST SMOKY ALTERNATIVE (West of Highway 376		36 miles	48 miles	7 miles
Contrasts				
Landform	8			
Vegetation	6			
Structures	20[a]			
WEST SMOKY ALTERNATIVE (East of Highway 376)		23 miles	55 miles	13 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	16			

MAXIMUM ALLOWABLE CONTRAST:
VRM Class III - 16
VRM Class IV - 20
VRM Class V - No maximum allowable contrast

[a]Exceeds BLM restrictions for one or more BLM VRM Class on the specific route.

TABLE 3-6

SUMMARY OF VISUAL IMPACTS OF THE ALTERNATE STEEL "H"-FRAME TRANSMISSION LINE STRUCTURES FOR ALL ALTERNATE LINE LOCATIONS

	Rating	VRM Class III	VRM Class IV	VRM Class V
PROPOSED CORRIDOR		-	80 miles	6 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	14			
WEST SMOKY ALTERNATIVE (West of Highway 376)		36 miles	48 miles	7 miles
Contrasts				
Landform	8			
Vegetation	6			
Structures	20[a]			
WEST SMOKY ALTERNATIVE (East of Highway 376)		23 miles	55 miles	13 miles
Contrasts				
Landform	5			
Vegetation	6			
Structures	16			

MAXIMUM ALLOWABLE CONTRAST:
VRM Class III - 16
VRM Class IV - 20
VRM Class V - No maximum allowable contrast

[a]Exceeds BLM restrictions for one or more BLM VRM Class on the specific route.

(Class II) to the west, and thus would result in very significant impacts to visual resources.

For the West Smoky Valley Alternative corridor, assuming line location on the east side of the highway, the wood K-frame structure would exceed VRM Class III contrast restrictions. The remaining options would cause visual contrasts which meet VRM Class III restrictions. Again, as discussed for the proposed structures on the West Smoky Valley Alternative corridor, the line would be directly in the view of the Toiyabe Mountains (Class II) for a distance of approximately 15 miles. Construction of the line in this corridor using any options, including the proposed structures, would significantly indirectly affect the VRM Class II area.

CHAPTER 4

LIST OF PREPARERS

INTRODUCTION

The following individual had primary responsibility for conducting the technical report. His education, project responsibilities, qualifications, and experience are summarized below.

MERLYN J. PAULSON, Visual Analyst

B.L.A. in Landscape Architecture and Environmental Planning, Utah State University; M.L.A. in Landscape Architecture and Resource Planning, Harvard University.

Anaconda Nevada Moly Project: Responsible for visual resources, technical discipline report.

Experience includes design and implementation of widely applied visual analysis methodologies using manual and computer techniques; preparation of visual impact and mitigation statements for power plants, stripmines, and transmission lines; application of the BLM, Forest Service, and own methodologies for the above studies.

CHAPTER 5

CONSULTATION AND COORDINATION

This technical discipline report for the Anaconda Nevada Moly Project was prepared by Merlyn J. Paulson, Fort Collins, Colorado. Application of the BLM VRM System to the Study Area was provided by Mr. Dave McMorran, Visual Resource Specialist, Battle Mountain District, Nevada. Consultation and coordination for this project included meetings and conversations with ERT/ECOLOGY CONSULTANTS, INC.; Mr. Rex Rowley, Area Manager, Mr. Dave Eddy, Geologist, and Ms. Mary Gillio, Realty Specialist, of the BLM Tonopah Resource Area office; Mr. Rich Hagan, BLM Nevada State Landscape Architect; Mr. Kurt Ballentyle, BLM, Elko, Nevada; Mr. Dave McMorran, Visual Resource Specialist, Battle Mountain District, Nevada; and Mr. Lawrence Gamble, Regional Resource Planner, Fort Collins, Colorado.

The scenic sensitivity survey was developed by Mr. Dave McMorran with the assistance of Mr. Dave Eddy; Mr. Jon Joseph, Recreation Planner, Tonopah Resource Area; Mr. Russ Koch, Wilderness Specialist, District Office; Ms. Dorothy Mason, Wildlife Biologist, Tonopah Resource Area; and Mr. Mark O'Brien, Range Conservationist, District Office.

CHAPTER 5

CONSULTATION AND COORDINATION

CHAPTER 6

APPENDICES

APPENDIX A - METHODOLOGY

The Bureau of Land Management's Visual Resource Management System was applied to the project area by the Battle Mountain District Office to identify Visual Resource Management Classes, and by ERT to identify visual impacts caused by the Proposed Actions and Alternatives, and appropriate mitigation measures. The accompanying flow diagram (Figure 6-1) describes the procedure used in this study.

Methodology

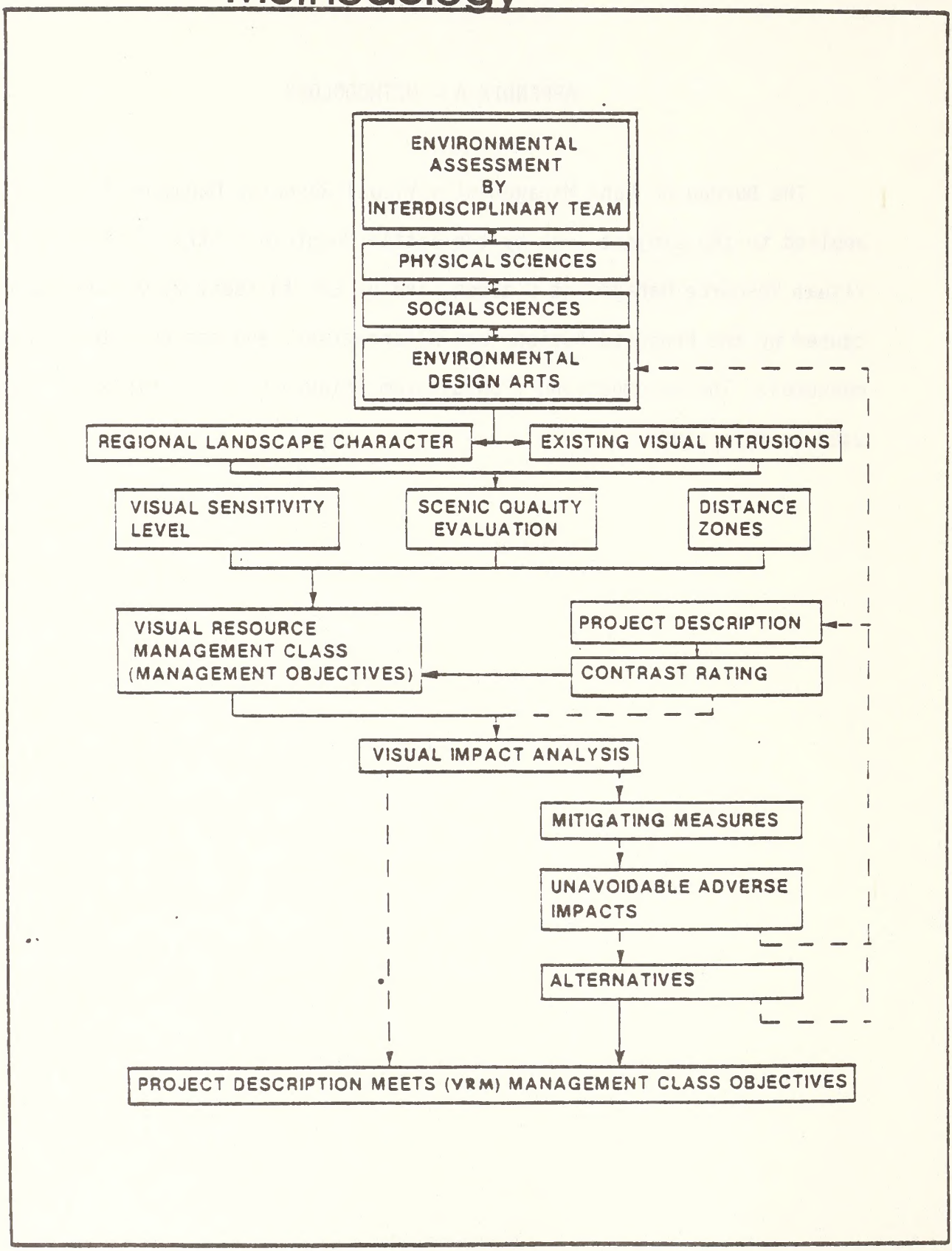


Figure 6-1. Flow diagram of methodology.

APPENDIX B - CHARTS, MAPS, AND PHOTOGRAPHS

The accompanying text, charts, and maps are required as data, analysis material, and documentation material for the BLM's Visual Resource Management System.

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Physiographic Province Map - Continental United States

Figure 6-2. Physical Province.

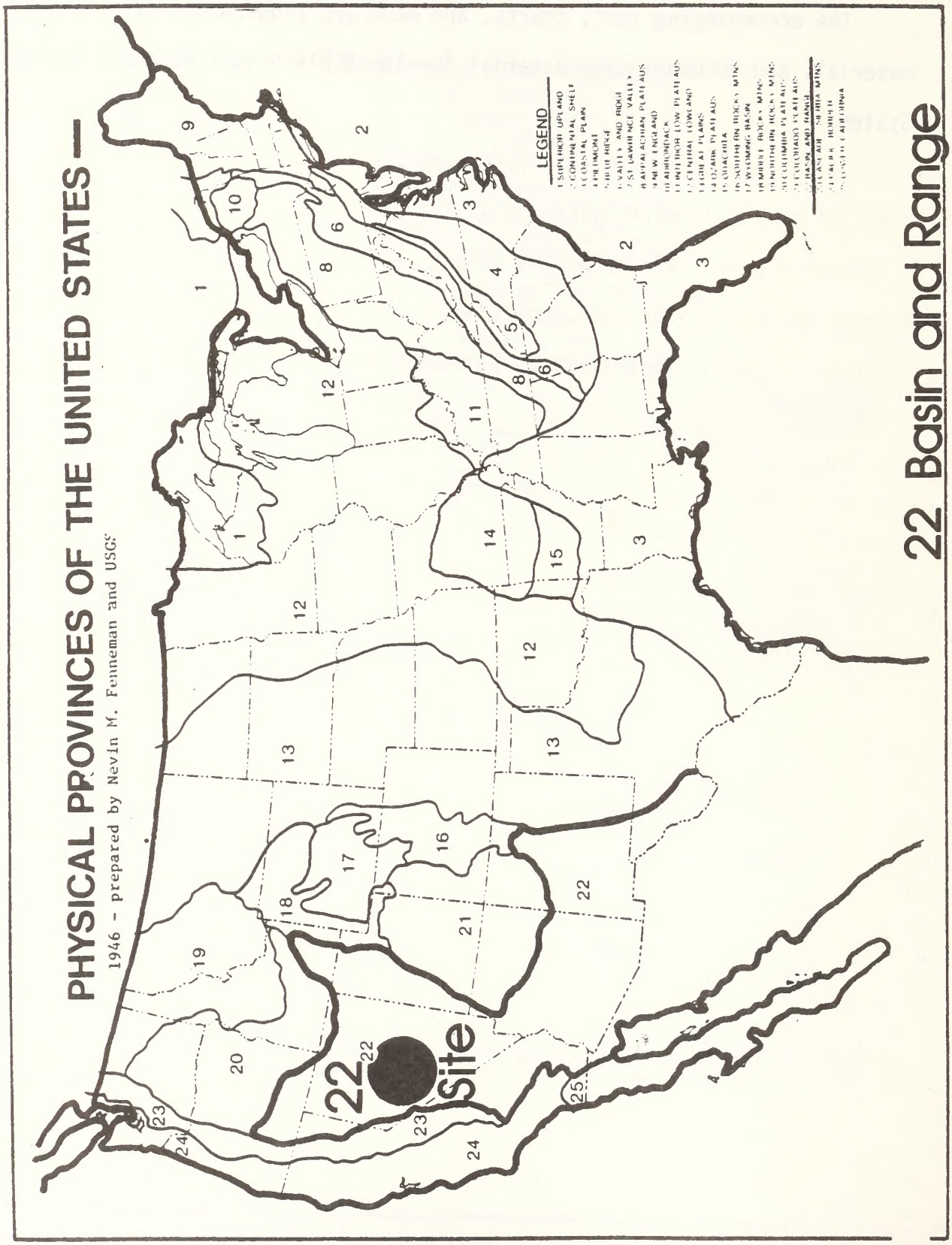


Figure 6-3. Scenic quality chart.

SCENIC QUALITY
INVENTORY AND EVALUATION CHART

key factors	rating criteria and score		
landform	High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. 5	Steep canyons, mesas, buttes, cinder cones and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features present and interesting though not dominant or exceptional. 3	Low, rolling hills, foothills or flat valley bottoms. Interesting detail landscape features few or lacking. 1
vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. 5	Some variety of vegetation, but only one or two major types. 3	Little or no variety or contrast in vegetation. 1
water	Clear and clean appearing, still, cascading white water, any of which are a dominant factor in the landscape. 5	Flowing, or still, but not dominant in the landscape. 3	Absent or present, but not noticeable. 0
color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. 5	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. 3	Subtle color variations, contrast or interest; generally mute tones. 1
influence of adjacent scenery	Adjacent scenery greatly enhances visual quality. 5	Adjacent scenery moderately enhances overall visual quality. 3	Adjacent scenery has little or no influence on overall visual quality. 0
scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. 6	Distinctive, though somewhat similar to others within the region. 2	Interesting within its setting, but fairly common within the region. 1
cultural modifications	Free from aesthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety. 2	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensive that the scenic qualities are entirely negated or modifications add little or no visual variety to the area. 0	Modifications are so extensive that scenic qualities are for the most part nullified or substantially reduced. -4

INSTRUCTIONS

Purpose: To rate the visual quali of the scenic resource on all BLM managed lands.

How to Identify Scenic Value: Al Bureau lands have scenic value.

How to Determine Minimum Suitabili All BLM lands are rated for scenic values. Also rate adjacent or int mingling non-BLM lands within the planning unit.

When to Evaluate Scen Quality: for scenery under the most critic conditions (i.e., highest user pe or season of use, sidelight, prop atmospheric conditions, etc.).

How to Delineate Rating Areas: C the following factors when deline rating areas.

1. Like physiographic character (i.e., land form, vegetation etc

2. Similar visual patterns, tex color, variety, etc.

3. Areas which have a similar from cultural modifications (i.e. roads, historical and other struc mining operations, or other surf disturbances).

Explanation of Criteria
(See Illustration 5.)

NOTE: Values for each rating crit are maximum and minimum scores on It is also possible to assign sco within these ranges.

SCENIC QUALITY

A = 19-33
B = 12-18
C = 0-11

65

Figure 6-4. Scenic quality form--001

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1-16-80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-001

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	angular blocks	conical	
LINE	vertical		
COLOR	blue,grey,pink & white	fall; vivid red and yellow; deep greens, yellow and greys	
TEXTURE			

3. Narrative

High vertical relief expressed in prominent cliffs, spires and outcrops. Some variety in vegetation but predominantly Pinyon and Juniper forests or sage. Riparian bands are the exception and indicate water locations. Snow pack on the higher slopes persists until late June or July in most years and forms a sharp contrast with the rock colors and vegetation. Vivid fall colors occur in riparian areas. Although not unique. this range is an unusually high uplift and seeing it is a memorable experience. There are no noticeable cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	(5)	3	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(1)	
d. Color	(5)	3	1	
e. Influence	5	3	(0)	
f. Scarcity	(5)	2	1	
g. Cultural Modification	(2)	0	-4	
TOTALS	17 + 4 + 0 = 21			

SCENIC QUALITY CLASSIFICATION

- [X] Class A – 19–33
- [ ] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1978)

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Scenic Quality Field Inventory

Figure 6-5. Scenic quality form--002

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-002

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	angular blocks	conical	
LINE	vertical		
COLOR	blue, grey, pink & white	fall: vivid red and yellow; deep greens, yellow and greys	
TEXTURE			

3. Narrative

High vertical relief expressed in prominent cliffs, spires and outcrops. Some variety in vegetation but predominantly Pinyon and Juniper forests or sage. Riparian bands are the exception and indicate water locations. Snow pack on the higher slopes persists until late June or July in most years and forms a sharp contrast with the rock colors and vegetation. Vivid fall colors occur in riparian areas. Although not unique, this range is an unusually high uplift and seeing it is a memorable experience. There are no noticeable cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	0	
d. Color	5	3	1	
e. Influence	5	3	(0)	
f. Scarcity	5	3	1	
g. Cultural Modification	(2)	0	-4	
TOTALS	15 + 4 + 0 = 19			

SCENIC QUALITY CLASSIFICATION

- [X] Class A – 19–33
- [ ] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

Figure 6-6. Scenic quality form--003

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1-16-80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-003

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	planar w/ vee notches	blanket w/ wall-like riparian areas	rectangular clusters
LINE	continuous horizontal		
COLOR	reddish when visible	grey-greens, yellow	white, yellow
TEXTURE	fine	fine	

3. Narrative

Bajadas of the Toiyabes; broadly sloping plain with interesting erosional features. Vegetation is sage, occasionally cut by riparian areas. Although present, water is unnoticeable. Generally has muted grey and green colors. The adjacent scenery greatly enhances the visual quality of this unit; the unit itself is a fairly common form of alluvial fan but is well illustrated here in a bajada form. Cultural modifications add little to the visual variety of the area.

4. SCORE (*Circle Appropriate Level*) *

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	3	1	
c. Water	5	3	1	
d. Color	5	3	1	
e. Influence	5	3	0	
f. Scarcity	5	2	1	
g. Cultural Modification	2	0	-4	
TOTALS	6 + 3 + 4 = 13			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A - 19-33
- [X] Class B - 12-18
- [ ] Class C - 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

Figure 6-7. Scenic quality form--004

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-004

1. Evaluators (names)

McMorran

2. LANDSCAPE CHARACTER (Feature)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (General)
FORM	planar w/ vee notches	blanket	
LINE	generally continuous horizontal		
COLOR	reddish or black	grey-greens, yellow	
TEXTURE	fine	fine	

3. Narrative

Bajada of the northern Toquimas: a broadly sloping plain with some interesting erosional features. Primarily blanketed with sage but well developed riparian areas occurring below unit 002. Colors are grey-green and yellow-green. Adjacent scenery greatly enhances the southern part of this unit. Unit itself is a fairly typical alluvial feature, unusual only in the extent of parts of it. Cultural features are not noticeable.

4. SCORE (Circle Appropriate Level)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	3	1	
c. Water	5	3	1	
d. Color	5	3	1	
e. Influence	5	3	0	
f. Scarcity	5	2	1	
g. Cultural Modification	2	0	-4	
TOTALS	2 +	3 +	6 =	11

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [ ] Class B – 12–18
- [X] Class C – 11 or less

* See Scenic Quality Rating Criteria in BLM Manual Section 8411

Form 8400-1 (September 1973)

Figure 6-8. Scenic quality form--005

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-005

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	planar w/ vee notches	blanket	
LINE	generally continuous horizontal		
COLOR	reddish to yellowish	grey-green	
TEXTURE	fine	fine	

3. Narrative

Southern Bajadas; sloping plains blanketed with sage community plants. No notable riparian development. Colors are grey-green and brown. Some cultural modifications but they are confined to limited areas.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	3	1	
c. Water	5	3	0	
d. Color	5	3	0	
e. Influence	5	3	0	
f. Scarcity	6	2	1	
g. Cultural Modification	2	0	-4	
TOTALS	0 -	0 +	5 =	5

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [ ] Class B – 12–18
- [X] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1973)

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Scenic Quality Field Inventory

Figure 6-9. Scenic quality form--006

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-006

1. Evaluators (names)

McMorran

2. LANDSCAPE CHARACTER (Feature)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (General)
FORM	angular but rounded edged blocks	"islands"	
LINE	soft sawtoothed		
COLOR	white, pink, black	greens (grey, dark, yellow)	
TEXTURE	moderate	moderate	

3. Narrative

Moderately high mountain area with some steep canyons and several mesas; interesting but not exceptional. Vegetation consists of Pinyon-Juniper forests mixed with areas of sage. Water is not noticeable. Unit is a common fault block range with few cultural modifications.

4. SCORE (Circle Appropriate Level)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	3	1	
c. Water	5	3	0	
d. Color	5	3	1	
e. Influence	5	3	1	
f. Scarcity	5	3	1	
g. Cultural Modification	2	0	-4	
TOTALS	2 + 9 + 1 = 12			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* See Scenic Quality Rating Criteria in BLM Manual Section 8411

Form 8400-1 (September 1973)

Figure 6-10. Scenic quality form--007

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-007

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	angular but rounded edged blocks	"islands"	
LINE	soft sawtoothed		
COLOR	white, pink, black	greens (grey, dark, yellow)	
TEXTURE	moderate	moderate	

3. Narrative

Moderately high mountain area with some steep canyons and several mesas; interesting but not exceptional. Vegetation consists of Pinyon/Juniper forests mixed with areas of sage. Water is not noticeable. Unit is a common fault block range with few cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	6	2	(1)	
g. Cultural Modification	(2)	0	-4	
TOTALS	2 +	9 +	1 =	12

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1973)

Figure 6-11. Scenic quality form--008

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-008

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	flat plain	blanket	blocks
LINE	horizontal		
COLOR		grey-green	
TEXTURE	fine	fine	

3. Narrative

A flat, generally nondescript valley bottom area. Sage is the dominant vegetation which casts a grey-green hue over the entire unit. Ranches are the major cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	(1)	
b. Vegetation	5	3	(1)	
c. Water	5	3	(0)	
d. Color	5	3	(1)	
e. Influence	5	3	(0)	
f. Scarcity	6	3	(0)	
g. Cultural Modification	2	(0)	-4	
TOTALS	0 + 0 + 4 = 4			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A - 19-33
- [ ] Class B - 12-18
- [X] Class C - 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

Figure 6-12. Scenic quality form--009

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-009

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	flat plain	no vegetation to islands of brush to blankets of grass	
LINE	horizontal curvilinear	horizontal	
COLOR	pink, blue, white, greens, black, yellow	green, red, grey	
TEXTURE	fine	fine	

3. Narrative

Major alkaline sink or playa and associated wet lands. Although flat, the geologic and geographic nature of the area is interesting. The unit contains a variety of vegetative types and colors and a significant body of water. The steep ranges to either side greatly enhance the setting.

4. SCORE (*Circle Appropriate Level*) *

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	(1)	
b. Vegetation	5	(3)	1	
c. Water	(5)	3	0	
d. Color	5	(3)	1	
e. Influence	5	(3)	0	
f. Scarcity	6	(2)	1	
g. Cultural Modification	2	(0)	-4	
TOTALS	5 + 11 + 1 = 17			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1973)

Figure 6-13. Scenic quality form--010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1-16-80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-010

1. Evaluators (names)

McMorran

2. LANDSCAPE CHARACTER (Feature)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (General)
FORM	flat plain	blanket	blocks
LINE	horizontal		
COLOR		grey-green	
TEXTURE	fine	fine	

3. Narrative

A flat, generally nondescript valley bottom area. Sage is the dominant vegetation which casts a grey-green hue over the entire unit. Ranches are the major cultural modifications along with the community of Carver's Junction.

4. SCORE (Circle Appropriate Level)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	(1)	
b. Vegetation	5	3	(1)	
c. Water	5	3	(0)	
d. Color	5	3	(1)	
e. Influence	5	3	(0)	
f. Scarcity	6	2	(1)	
g. Cultural Modification	2	0	(-1)	
TOTALS	0 + 0 + 0 = 0			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [ ] Class B – 12–18
- [X] Class C – 11 or less

* See Scenic Quality Rating Criteria in BLM Manual Section 8411

Form 8400–1 (September 1973)

Figure 6-14. Scenic quality form--011

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1-16-80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-011

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	angular but rounded edged blocks	"islands"	
LINE	soft sawtoothed		
COLOR	white, pink, black	greens (grey, dark, yellow)	
TEXTURE	moderate	moderate	

3. Narrative

Moderately high mountain area with some steep canyons and several mesas; interesting but not exceptional. Vegetation consists of Pinyon-Juniper forests mixed with areas of sage. Water is not noticeable. Unit is a common fault block range with few cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	5	3	(1)	
g. Cultural Modification	(2)	0	-4	
TOTALS	2 + 9 + 1 = 12			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1978)

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Scenic Quality Field Inventory

Figure 6-15. Scenic quality form--012

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1-16-80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-012

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	crescent shaped	none	
LINE	curvilinear		
COLOR	sandy white		
TEXTURE	very fine		

3. Narrative

Crescent Sand Dunes; a moderately sized dune system, the only one in the district; unusual but not unique within the province. The area has no vegetation or cultural modifications.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	(5)	3	1	
b. Vegetation	5	3	(1)	
c. Water	5	3	(0)	
d. Color	5	3	(1)	
e. Influence	5	3	(0)	
f. Scarcity	5	3	1	
g. Cultural Modification	(2)	0	-4	
TOTALS	12 +	0 +	2 =	14

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400–1 (September 1973)

Figure 6-16. Scenic quality form--013

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1/16/80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-013

1. Evaluators (*names*)
McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	Angular, rounded edge blocks		
LINE	Oblique	Oblique	Vertical and horizontal
COLOR	Lt. brown, grey	grey-green dark green yellow-green	Lt. grey/tan
TEXTURE	Moderately grained	moderately grained	

3. Narrative

This scenery unit is comprised of the northern Toiyabe Mountains. Forms are angular with round edged blocks. Vegetation consists of islands of pinyon/juniper forest with interspersed sage and grasses. The 230 KV Transmission Line exhibits moderate horizontal and vertical lines.

4. SCORE (*Circle Appropriate Level*)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	5	3	(1)	
g. Cultural Modification	(2)	0	-4	
TOTALS	2 + 9 + 1 = 12			

SCENIC QUALITY CLASSIFICATION

☐ Class A – 19–33
☒ Class B – 12–18
☐ Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Scenic Quality Field Inventory

Figure 6-17. Scenic quality form--014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date 1/16/80
District NV-060
Planning unit Moly Project
Scenic quality rating unit MP-014

1. Evaluators (names)

McMorran

2. LANDSCAPE CHARACTER (Feature)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (General)
FORM	Angular, round edged blocks		
LINE	Oblique	Oblique	Vertical and horizontal
COLOR	Lt. brown/grey	grey-green dark green yellow-green	Lt. grey/tan
TEXTURE	Moderately grained	moderately grained	

3. Narrative

This scenery unit is composed of the Simpson Park mountains. Forms are angular with rounded edges. Vegetation consists of islands of pinyon-juniper forest with interspersed sage and grasses. The 230 KV transmission line exhibits moderate horizontal and vertical lines. Colors range from grey-green to tan and brown.

4. SCORE (Circle Appropriate Level)*

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	5	3	(1)	
g. Cultural Modification	(2)	0	-4	
TOTALS	2 + 9 + 1 = 12			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [X] Class B – 12–18
- [ ] Class C – 11 or less

* See Scenic Quality Rating Criteria in BLM Manual Section 8411

Form 8400-1 (September 1973)

Figure 6-18. Scenic quality form--015

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1/16/80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-015

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	Angular		
LINE	Oblique		
COLOR	Lt. brown and grey	green and grey-green	
TEXTURE	Fine to moderate	fine grained	

3. Narrative

This scenery unit consists of the angular mountains north of Route 95 at the western edge of the Lower Big Smoky Valley floor. Vegetation is composed mainly of sage and arid region grasses. Colors range from grey-green to tan and light grey-brown.

4. SCORE (*Circle Appropriate Level*) *

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	5	2	(1)	
g. Cultural Modification	(2)	0	-1	
TOTALS	2 +	9 +	1 =	12

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [ ] Class B – 12–18
- [X] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

Figure 6-19. Scenic quality form--016

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date	1/16/80
District	NV-060
Planning unit	Moly Project
Scenic quality rating unit	MP-016

1. Evaluators (*names*)

McMorran

2. LANDSCAPE CHARACTER (*Feature*)

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE (*General*)
FORM	Angular		
LINE	Oblique		
COLOR	Lt. brown and grey	green and grey-green	
TEXTURE	Fine to moderate	fine grained	

3. Narrative

This scenery unit consists of the angular mountains east of Tonopah and south of Route 95. Colors are homogenously green, light brown and grey. Vegetation is composed of sage and arid region grasses.

4. SCORE (*Circle Appropriate Level*) *

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	(3)	1	
b. Vegetation	5	(3)	1	
c. Water	5	3	(0)	
d. Color	5	(3)	1	
e. Influence	5	3	(0)	
f. Scarcity	5	2	(1)	
g. Cultural Modification	(2)	0	-4	
TOTALS	2 + 9 + 1 = 12			

SCENIC QUALITY CLASSIFICATION

- [ ] Class A – 19–33
- [ ] Class B – 12–18
- [X] Class C – 11 or less

* *See Scenic Quality Rating Criteria in BLM Manual Section 8411*

Form 8400-1 (September 1973)

8411 - VISUAL RESOURCE INVENTORY AND EVALUATION

Criteria for Use Volume Sensitivity Level

Figure 6-20. Use volume form.

USE VOLUME:

CRITERIA	HIGH	H	MEDIUM	M	LOW	L
(1) Use volume (total) use, no distinction between types) cars and trains	Segments of travel routes, use sites or population centers which receive 200,000 or more visits/yr. or more than 200 vehicles/day (ADT year round), or comparable degree of use on a seasonal basis.		Segments of travel routes, use sites or population centers which receive 20,000 to 200,000 visits/year or 20 to 200 vehicles per day (ADT year round), or a comparable degree of use on a seasonal basis.		Travel route segments with less than 20,000 visits/yr. or less than 20 vehicles/day (ADT year round).	
(2) Use volume - trails, rivers, water bodies, trams	20,000 or more visits/yr.		2000 - 20,000 visits/yr.		less than 2000 visits/yr.	

NOTE:

1. Select highest of two criteria in arriving at final determination for use volume criteria
2. Information should be obtained from most reliable source. ADT counts from State transportation plan, BLM transportation plan, etc.

Figure 6-21. User attitudes toward change.

ACTIVITY	SCENERY QUALITY RATING UNITS*																															
	001		002		003		004		005		006		007		008		009		010		011		012		013		014		015		016	
	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis	Res	Vis
build a new gravel road	M	H	M	H	L	L	L	L	L	L	M	M	M	H	L	L	L	L	L	L	L	L	M	H	L	L	L	L	L	L	L	L
build a new paved road	H	H	M	H	L	M	L	M	L	M	M	H	M	H	L	L	L	L	L	L	L	L	M	H	L	M	L	M	L	M	L	M
open a new barite mine	H	H	M	H	L	M	L	M	L	M	M	H	M	H	L	M	L	M	L	L	L	L	M	H	L	M	L	M	L	M	L	M
dig a new gravel pit	M	H	M	L	L	M	L	L	L	L	L	M	L	M	L	L	L	L	L	L	L	L	M	H	L	M	L	M	L	M	L	M
build a new land fill	M	H	M	H	L	M	L	L	L	L	M	M	M	M	L	L	L	M	L	L	L	L	M	H	L	M	L	M	L	M	L	M
construct tailing dams	M	H	M	H	L	M	L	L	L	L	M	H	M	M	L	L	L	L	L	L	L	L	M	H	L	M	L	M	L	M	L	M
construct settling ponds	M	H	M	H	L	M	L	L	L	L	M	H	M	M	L	L	L	L	L	L	L	L	M	H	L	M	L	M	L	M	L	M
build a reservoir	M	M	M	M	L	M	L	L	L	L	L	M	L	M	L	L	L	L	L	L	L	L	M	H	L	M	L	M	L	M	L	M
timber harvest	M	H	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
grazing	L	M	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
range modification	L	M	L	M	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
new mobile home sites	H	H	M	H	M	M	M	M	M	M	M	H	M	M	L	L	L	L	L	M	L	M	M	H	M	M	M	M	M	M	M	M
mobile home park	H	H	M	H	M	M	M	M	L	M	M	H	M	M	L	L	L	L	L	M	L	M	M	H	M	M	M	M	M	M	M	M
new home sites	H	H	M	H	M	M	M	M	L	M	M	H	M	M	L	L	L	L	L	M	L	M	M	H	M	M	M	M	M	M	M	M
230 KV transmission line	M	H	M	M	L	M	L	L	L	L	M	M	M	M	L	L	L	L	L	L	L	M	M	H	L	M	L	M	L	M	L	M
telephone line	M	M	M	M	L	M	L	L	L	L	M	M	M	M	L	L	L	L	L	L	L	L	M	M	L	M	L	M	L	M	L	M
generating station	M	H	M	M	M	M	L	M	L	L	M	M	M	M	L	L	L	M	L	L	L	M	M	H	M	M	M	M	M	M	M	M
oil & gas facilities	H	H	M	H	M	H	M	M	L	M	M	H	M	M	L	M	L	M	L	L	L	M	M	H	M	H	M	H	M	H	M	H
recreation facilities	L	M	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	M	L	L	L	L	L	L	L	L
a small water tank	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
a large water tank	L	M	M	M	L	M	L	L	L	L	M	M	L	M	L	L	L	L	L	L	L	L	M	M	L	M	L	M	L	M	L	M
microwave tower	M	M	L	M	M	M	L	L	L	L	L	M	L	M	L	L	L	L	L	L	L	M	M	H	M	M	M	M	M	M	M	M
industrial structures	M	H	M	H	M	H	M	M	L	M	M	M	M	M	L	M	L	M	L	L	L	M	H	H	M	H	M	H	M	H	M	H
geothermal plant	H	H	M	H	M	H	M	M	L	M	M	H	M	M	L	M	L	M	L	L	L	M	H	H	M	H	M	H	M	H	M	H
LEVEL OF SIGNIFICANCE	HIGH		MODERATE		LOW		LOW		LOW		MODERATE		MODERATE		LOW		LOW		LOW		LOW		MODERATE		LOW		LOW		LOW		LOW	

*Res = residents; Vis = visitors

H = High Sensitivity Toward Change
M = Moderate Sensitivity Toward Change
L = Low Sensitivity Toward Change

8411 - UPLAND VISUAL RESOURCE INVENTORY AND EVALUATION

Matrix for Determining Visual Sensitivity Levels

Figure 6-22. Viewer sensitivity matrix.

user attitude	quantity of use	
H	H	HIGH SENSITIVITY
H	M	
M	H	
H	L	
L	H	MEDIUM SENSITIVITY
M	M	
M	L	
L	M	LOW SENSITIVITY
L	L	

NOTE: User attitude will take precedence over quantity of use for this evaluation.

8411 - UPLAND VISUAL RESOURCE INVENTORY AND EVALUATION

Matrix For Determining Visual Resource Management Classes

Figure 6-23. Resource management class matrix.

	VISUAL SENSITIVITY[2]						
	high			medium			low
special areas	I	I	I	I	I	I	I[4]
SCENIC QUALITY[1] A	II	II	II	II	II	II	II
B	II	III	III[5] / IV	III	IV	IV	IV
C	III	IV	IV	IV	IV	IV	IV
DISTANCE ZONES[3]	fg-mg	bg	ss	fg-mg	bg	ss	ss

*1 SCENIC QUALITY.....A, B, C
8411

*2 VISUAL SENSITIVITY LEVEL.....high, medium, low
8411

*3 DISTANCE ZONES.....fg-mg - foreground-middleground
8411 bg - background
ss - seldom-seen

*4 MANAGEMENT CLASSES.....I, II, III, IV
8411

*5. If the area being evaluated is adjacent to any VRM class III or higher, select class III; if lower, select VRM class IV.

NOTES: Class I applies only to classified special areas, e.g., Wilderness, Natural Areas, etc. This quality standard is established through legislation or policy.

Class V applies to areas identified in the scenic quality inventory where the quality class has been reduced because of unacceptable cultural modifications or areas that have the potential for enhancement.

Future and potential Class A areas or sites (identified in Recreation Information System) will be analyzed in Recreation URA 3 & 4. Recommendations for MFP 1 (Recreation) should specify VRM Class I, II, III to ensure future site or area protection.

Figure 6-24. Mine/Mill impact worksheet.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 11/12/79

District Battle Mountain

Planning unit

Activity Mine/Mill Complex

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Anaconda Nevada Moly Mine/Mill		

4a. LOCATION			5. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Site * ↑ View ← N

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat - sloping up to mine/mill site
	LINE	Horizontal foreground - oblique background
	COLOR	Lt. brown/grey
	TEXTURE	Smooth to medium on mountains
2. VEGETATION	FORM	Not dominant
	LINE	Subtle horizontal
	COLOR	Lt. grey/brown/tan/yellow
	TEXTURE	Background / Midground / Foreground Smooth - Medium - Coarse
3. STRUCTURES	FORM	Not dominant
	LINE	Not dominant
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

Page 1

Form 8400-4 (September 1973)

8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-24 (cont.)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Dominant block forms
	LINE	Long horizontal and vertical and occasional oblique
	COLOR	Dark brown - lt. brown-grey
	TEXTURE	Smooth medium
2. VEGETATION	FORM	Edges form block shapes and angular shapes
	LINE	Edges form horizontal and vertical lines and oblique lines
	COLOR	Dark grey/tan/brown/yellow/greens (new)
	TEXTURE	Edges medium to coarse
3. STRUCTURES	FORM	Block forms and lattice angular
	LINE	Dominant horizontal, vertical and oblique
	COLOR	Lt. Med. grey/green/tan
	TEXTURE	Coarse medium

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		26				16				15			

1a. Maximum element contrast

Color most important

b. Maximum feature contrast

Structures/landform

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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8431- VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-24 (cont.)

SECTION E. REDESIGN, STIPULATIONS, MITIGATING MEASURES

a. round corners of tailings dam
b. use non-reflectant metal surfaces
c. change colors to match surrounding vegetation/landform
d. revegetation of tailings retention dam
e. sloping and revegetation of visible mine highwall

SECTION F. DESCRIPTION OF ACTIVITY (Redesigned)

1. LAND/WATER	FORM	Subtle block forms
	LINE	Subtle horizontal and vertical
	COLOR	Lt. grey/brown
	TEXTURE	Medium
2. VEGETATION	FORM	Subtle block edges
	LINE	Subtle horizontal and vertical edges
	COLOR	Lt. grey/green/brown
	TEXTURE	Medium
3. STRUCTURES	FORM	Block forms (visible but not dominant)
	LINE	Horizontal and vertical (visible but not dominant)
	COLOR	Lt. grey/tan
	TEXTURE	Medium

(Continued on page 4)

Page 3

8431- VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-24 (cont.)

SECTION G. CONTRAST RATING *(Redesigned)*

DEGREE OF CONTRAST	FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS: Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS	15				11				15			

1a. Maximum element contrast

b. Minimum feature contrast

2. Does project design meet visual resource management requirements? [X] Yes [ ] No

If "no," request services of district landscape architect, and describe amount of time and when required.

3. Fiscal year 19

4. Which third? *(check one)* [ ] First [ ] Second [ ] Third

5. TIME REQUIRED

DAYS	MAN-MONTHS

SECTION H. RECOMMENDATIONS

1. Recommendation of staff landscape architect if allowable contrast rating cannot be met

Signature | Date

2. Decision and justification of Area or District Manager

Signature | Date

3. Check appropriate box: [ ] Proceed with project/activity as mitigated [ ] Cancel project/activity as proposed

Signature | Date

Page 4

Figure 6-25. Transmission Line Proposed Action impact worksheet.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	11/12/79
District	Battle Mountain
Planning unit	
Activity	Proposed Action

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION			5. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green, tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	Blocky - not typical not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-25 (cont.)

PROPOSED ACTION

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Light grey, tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Strongly horizontal edges
	COLOR	Light grey, green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strong vertical in foreground, horizontal in background
	COLOR	Dark grey brown
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

DEGREE OF CONTRAST	FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS: Form (4x)	12	8	4	0	12	8	4	0	12	8	X	0
Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
Color (2x)	6	4	2	0	6	4	2	0	6	4	X	0
Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS	5				6				20 X			

1a. Maximum element contrast: Line

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures: propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

Page 2

Figure 6-26. Switching Station impact worksheet.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	1/3/80
District	Battle Mountain
Planning unit	Moly Project
Activity	Switching Station

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION

TOWNSHIP RANGE SECTION

5. LOCATION MAP

Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Gently sloping
	LINE	Horizontal, oblique
	COLOR	Tan
	TEX-TURE	Smooth
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, light green, tan
	TEX-TURE	Smooth to moderately smooth
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground
	COLOR	Not dominant
	TEX-TURE	Not dominant

(Continued on page 2)

Page 1

Form 8400-4 (September 1973)

8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-26 (cont.)

Switching Station

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Block
	LINE	Horizontal
	COLOR	Dark brown
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal
	COLOR	Grey-green
	TEXTURE	Not dominant
3. STRUCTURES	FORM	Block
	LINE	Vertical and horizontal
	COLOR	Dark brown and metal grey
	TEXTURE	Fine grained

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		11				7				20			

1a. Maximum element contrast

Color

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-27. Alternative 1 impact worksheet.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	11/12/79
District	Battle Mountain
Planning unit	
Activity	West Side Option Alternative 1

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION			5. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green, tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	not typical Blocky - not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

Page 1

Form 8400-4 (September 1978)

Figure 6-27 (cont.)

ALTERNATIVE 1-WEST SIDE OPTION

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey/green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical plane/block
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Dark brown/grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		8				7				20			

1a. Maximum element contrast: Form

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-28. Alternative 1 impact worksheet.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 11/12/79
District Battle Mountain
Planning unit
Activity East Side Option Alternative 1

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION			b. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green, tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	not typical Blocky - not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-28 (cont.)

ALTERNATIVE 1-EAST SIDE OPTION

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/white
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Dark grey/brown
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				70			

1a. Maximum element contrast: Line

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator (signature) | Date

Page 2

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Figure 6-29.
Transmission Line Proposed Action Impact Worksheet (structure options)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 1/3/80
District Battle Mountain
Planning unit
Activity Proposed Action

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION

TOWNSHIP	RANGE	SECTION

b. LOCATION MAP

Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green, tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	not typical Blocky - not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)
Page 1
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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-29 (cont.)
Proposed Route

Option A, Wood "K"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Light grey,tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Strongly horizontal edges
	COLOR	Light grey, green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Dark brown
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				20			

1a. Maximum element contrast

Line

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-29 (cont.)
Proposed Route

Option B, Aluminum Guyed Delta and 4-legged Free Standing

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Light grey, tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Strongly horizontal edges
	COLOR	Light grey, green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strong vertical in foreground, horizontal in background
	COLOR	Med. grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				14			

1a. Maximum element contrast

Line

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* Date

Page 2

8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-29 (cont.)
Proposed Route

Option C, Concrete "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Light grey,tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Strongly horizontal edges
	COLOR	Light grey,green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Light grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST	FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS: Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS	5				6				14			

1a. Maximum element contrast: Line

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-29 (cont.)
Proposed Route

Option D, Steel "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Light grey, tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Strongly horizontal edges
	COLOR	Light grey, green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strong vertical in foreground, horizontal in background
	COLOR	Med. grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				14			

1a. Maximum element contrast

Line

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] Date

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Figure 6-30. West Side Option
Alternative 1 Impact Worksheet (structure options)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 1/3/80

District Battle Mountain

Planning unit

Activity West Side Option Alternative 1

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION			b. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green, tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	not typical Blocky - not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

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Form 8400-4 (September 1978)

8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-30 (cont.)
Alternate Route 1-West Side Option

Option A, Wood "K"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey/green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical plane/block
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Dark brown
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		8				7				20			

1a. Maximum element contrast

Form

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-30 (cont.)
Alternate Route 1-West Side Option

Option B, Aluminum Guyed Delta and 4-Legged Free Standing

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey/green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical plane/block
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Medium grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		8				6				20			

1a. Maximum element contrast: Form

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-30 (cont.)
Alternate Route 1-West Side Option

Option C, Concrete "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey/green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical plane/block
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Light grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST	FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS: Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS	8				6				20			

1a. Maximum element contrast: Form

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-30 (cont.)
Alternate Route 1-West Side Option

Option D, Steel "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/tan
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey/green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical plane/block
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Medium grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		8				6				20			

1a. Maximum element contrast

Form

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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Figure 6-31. East Side Option, Alternative 1 Impact Worksheet (structure options).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: 1/3/80
District: Battle Mountain
Planning unit:
Activity: East Side Option Alternative 1

SECTION A. PROJECT INFORMATION

1. Project name	2. Critical viewpoint number	3. MFP Step III VRM class
Sierra Pacific/Anaconda		

4a. LOCATION			b. LOCATION MAP
TOWNSHIP	RANGE	SECTION	Refer to VRM Class Map

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	Flat valleys sloping up to rounded foothills & angular mountains
	LINE	Valley floor Horizontals (strong), oblique mountains
	COLOR	Silver grey, light green,tan
	TEXTURE	Smooth valley bottom, medium mountains
2. VEGETATION	FORM	Rounded
	LINE	Horizontal
	COLOR	Silver grey, medium to dark green, sand
	TEXTURE	Coarse foreground to fine background
3. STRUCTURES	FORM	not typical Blocky - not dominant (scattered)
	LINE	Strong vertical
	COLOR	Not dominant
	TEXTURE	Not dominant

(Continued on page 2)

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-31 (cont.)
Alternate Route 1-East Side Option

Option A, Wood "K"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/white
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Dark brown
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				20			

1a. Maximum element contrast

Line

b. Maximum feature contrast

Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-31 (cont.)
Alternate Route 1-East Side Option

Option B, Aluminum Guyed Delta and 4-legged Free Standing

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/white
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Medium grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				16			

1a. Maximum element contrast
Line

b. Maximum feature contrast
Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-31 (cont.)
Alternate Route 1-East Side Option

Option C, Concrete "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/white
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Light grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				16			

1a. Maximum element contrast: Line

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E. concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* [illegible] | Date

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8431 - VISUAL RESOURCE CONTRAST RATING

Visual Contrast Rating Worksheet

Figure 6-31 (cont.)
Alternate Route 1-East Side Option

Option D, Steel "H"-Frame

SECTION C. PROPOSED ACTIVITY DESCRIPTION
(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	Not dominant
	LINE	Strongly horizontal
	COLOR	Lt. grey/white
	TEXTURE	Not dominant
2. VEGETATION	FORM	Not dominant
	LINE	Horizontal edges
	COLOR	Light grey green
	TEXTURE	Very fine
3. STRUCTURES	FORM	Vertical block/plane
	LINE	Strongly vertical in foreground, horizontal in background
	COLOR	Medium grey
	TEXTURE	Not dominant

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	4	0	12	8	4	0	12	8	4	0
	Line (3x)	9	6	3	0	9	6	3	0	9	6	3	0
	Color (2x)	6	4	2	0	6	4	2	0	6	4	2	0
	Texture (1x)	3	2	1	0	3	2	1	0	3	2	1	0
TOTALS		5				6				16			

1a. Maximum element contrast: Line

b. Maximum feature contrast: Structures

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No
If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not preclude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)* | Date

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CHAPTER 7

GLOSSARY

(A)ESTHETICS Evaluation and considerations with the sensory qualities of resources (sight, sound, smell, taste, and touch) and especially with respect to judgment about their pleasurable qualities

ANGLE OF OBSERVATION The vertical angle between a viewer's line of sight and the slope or object being viewed

ADVERSE VISUAL IMPACT Any impact on the land or water form, vegetation, or any introduction of a structure which negatively changes or interrupts the visual character of the landscape and disrupts the harmony of the natural elements

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC's) FOR SCENIC VALUES Areas within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect or prevent irreparable damage to the scenic values. Lands/water representing outstanding scenic quality (Class A scenery) and scarcity of 5 or 6 will be considered as potential ACEC's for scenic values for MFP 1 recommendations

BACKGROUND The area of a distance zone which lies beyond the foreground-middleground. Usually from a minimum of 3 to 5 miles to a maximum of about 16 miles from a travel route, use area, or other observer position. Atmospheric conditions in some areas may limit the maximum to about 8 miles or increase it beyond 15 miles

BASIC ELEMENTS The four major elements (form, line, color, and texture) which determine how the character of a landscape is perceived

CHARACTERISTIC A distinguishing trait, feature, or quality

CHARACTERISTIC LANDSCAPE The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to a farming community, an urban landscape, a primarily natural environment, or other landscape which has an identifiable character

COLOR The property of reflecting light of a particular wavelength that enables the eye to differentiate otherwise unidentifiable objects

COMPUTER GRAPHICS Visual displays of information produced by an electronic computer. This includes both hard-copy and cathode-ray tube

CONTRAST The effect of a striking difference in the form, line, color, or texture of the landscape features within the area being viewed

CONTRAST RATING A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature (land and water form, vegetation, and structures)

CRITICAL VIEWPOINT The point(s) commonly in use or potentially in use where the view of a management activity is the most disclosing

CULTURAL MODIFICATION Any man-caused change in the land or water form or vegetation or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape

DISTANT ZONE The area that can be seen as foreground-middleground, background, or seldom-seen

DOMINANT ELEMENTS The basic elements (form, line, color, texture) in a particular landscape which exert the greatest influence on the visual character of the landscape

EASEMENT, SCENIC Essentially an easement of view which restricts the use of land adjoined to public highways, parks, and rivers, trails, etc.

ELIMINATION To remove or get rid of, especially as being visually undesirable

ENHANCEMENT A short-term management alternative which is accomplished to increase the visual variety where little or no variety exists at present

ENVIRONMENTAL DESIGN ARTS Art of design, planning, or management of the land, and the arrangement of natural and man-made elements thereon through application of cultural and scientific knowledge, with concern for resource conservation and stewardship, to the end that the resultant environment serves useful and enjoyable purposes

FOREGROUND-MIDDLEGROUND The area visible from a travel route, use area, or other observer position to a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline

FORM The mass or shape of an object or objects which appear unified, such as in the shape of the land surface or patterns placed on the landscape

HARMONY A combination of parts into a pleasing or orderly whole: congruity; a state of agreement or proportionate arrangement of form, line, color, and texture

INFRASTRUCTURE The foundation underlying a nation's, region's, or community's economy or social structure

INTERDISCIPLINARY TEAM A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions

INTRUSION A feature (land and water form, vegetation, or structure) which is generally considered out of context because of excessive contrast and disharmony with the characteristic landscape

KEY OBSERVER POSITION (KOP) One or a series of observer positions on a travel route or at a use area or a potential use area, that are used to determine seen area

LANDFORM A term used to describe the many types of land surfaces which exist as the result of geologic activity and weathering, e.g., plateaus, mountains, plains, and valleys

LANDSCAPE CHARACTER The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings

LANDSCAPE FEATURES The land and water form, vegetation, and structures which compose the characteristic landscape

LANDSCAPE MODIFYING ACTIVITIES Any actions which change the land and water form or vegetation or places structures on the landscape

LINE The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.

LIGHTING

- BACK LIGHTING A situation where the light source is coming from behind the object being viewed. Objects are generally in shadow with highlighted edge
- FRONT LIGHTING A situation where the light source is coming from behind the observer and falling directly upon the area being viewed
- SIDE LIGHTING A situation where the light source is coming from one side of a scene or object being viewed, usually the most critical for displaying contrast

MANAGEMENT ACTIVITY An activity of man placed or undertaken on the landscape for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using natural resources

MITIGATION MEASURES Methods or procedures committed to by Bureau Managers for the purposes of reducing or lessening the impacts caused by activities on the environment

MODIFICATION To reduce in degree or diminish in harshness the degree of visual contrast of a cultural intrusion or improvement

MULTIDISCIPLINARY TEAM A group of individuals with different training assembled to solve a problem. The problem is broken into pieces and each specialist works on a portion of the problem. Partial solutions are then linked together to provide the final solution

NATURALISTIC CHARACTER A landscape situation where the basic elements are displayed in a composition that appears natural within the surrounding area or characteristic landscape

OBSERVER POSITION The placement and relationship of a viewer to the landscape which is being perceived

PERCEPTION To become aware of and grasp mentally primarily through sight, but also through hearing, touch, taste, and smell

PHOTOMONTAGE A composite picture or edited film in which contrasting shots or sequences are placed side by side or blended for the purpose of suggesting a total idea or impression

PHYSIOGRAPHIC PROVINCE An extensive portion of the landscape normally encompassing many hundreds of square miles, which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin

PROTECTION A long-term management alternative and/or practice which assures that no irreplaceable or irreversible damage occurs to the visual resource by prescribing the degree of visual modification allowed for an area(s)

REHABILITATION A short-term management alternative and/or practice which returns existing adverse visual impacts through modification or elimination to a desired visual (scenic) quality

SCALE The proportionate size relationship between an object and the surroundings in which the object is placed

SCARCITY (OF SCENIC QUALITY VALUES) A scenic resource which is very rare or unique within a region, or may be somewhat more common but, because of its distinguishing characteristics, is unusually memorable

SCENIC AREA An area whose landscape character exhibits a high degree of variety, harmony, and contrast among the basic visual elements which results in a pleasant landscape to view

SCENIC QUALITY The degree of harmony, contrast, and variety within a landscape

SCENIC QUALITY CLASS The value (A, B, or C) assigned a scenic quality rating unit by applying the scenic quality evaluation key factors which indicate the relative visual importance of the unit to the other units within the physiographic region in which it is located

SCENIC QUALITY RATING UNIT A portion of the landscape which displays primarily homogeneous visual characteristics of the basic landscape features (land and water form, vegetation, and structures) which separate it from the surrounding landscape

SCENIC VALUES (Refer to "visual resource")

SEEN AREA That portion of the landscape which can be viewed from one or more observer positions. The extent or area that can be viewed is normally limited by landform, vegetation, or distance

SELDOM SEEN Portions of the landscape which are generally not visible from high and medium visual sensitivity level observer positions, and which are visible beyond approximately 15 miles from those positions

SENSITIVITY As applied to visual resource management, that degree of concern expressed by the user toward scenic quality and existing or proposed visual change in a particular characteristic landscape

SIMULATION The realistic visual portrayal which demonstrates the perceivable changes in the landscape features of a proposed management activity through the use of photography, artwork, computer graphics, and other such techniques

TEXTURE The interplay of light and shadow created by the variation in the surface of an object; the visual result of the tactile surface characteristics

USE VOLUME The total volume of visitor use each segment of a travel route or use area receives

VARIABLES Any of several nonspecific factors influencing visual perception. These factors are distance, angle of observation, time, size or scale, season of the year, light, and atmospheric conditions

VARIETY The state or quality of being varied and having the absence of monotony or sameness

VISUAL CONTRAST (See "contrast")

VISUAL MANAGEMENT UNIT An area of land where there is no variation in the distance zone, sensitivity level, and scenic quality

VISUAL RESOURCE The land, water, vegetative, animal, and other features that are visible on all lands (scenic values)

VISUAL RESOURCE MANAGEMENT CLASS The degree of visual change that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective

VISUAL RESOURCE MANAGEMENT (VRM) The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all BLM resource management activities

VISUAL SENSITIVITY LEVEL(S) An index of the relative degree of user interest in scenic quality and concern and attitude for existing or proposed changes in the landscape features of an area in relation to other areas in the planning unit

CHAPTER 8

REFERENCES

U.S. Department of Interior, Bureau of Land Management. 8400--Visual Resource Management (VRM). U.S.G.P.O. Washington, D.C.

Bureau of Land Management
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environmental assessment

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ENVIRONMENTAL ASSESSMENT

ON

PAVING THE BOULDER-TO-BULLFROG ROAD

Garfield County, Utah

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ENVIRONMENTAL ASSESSMENT

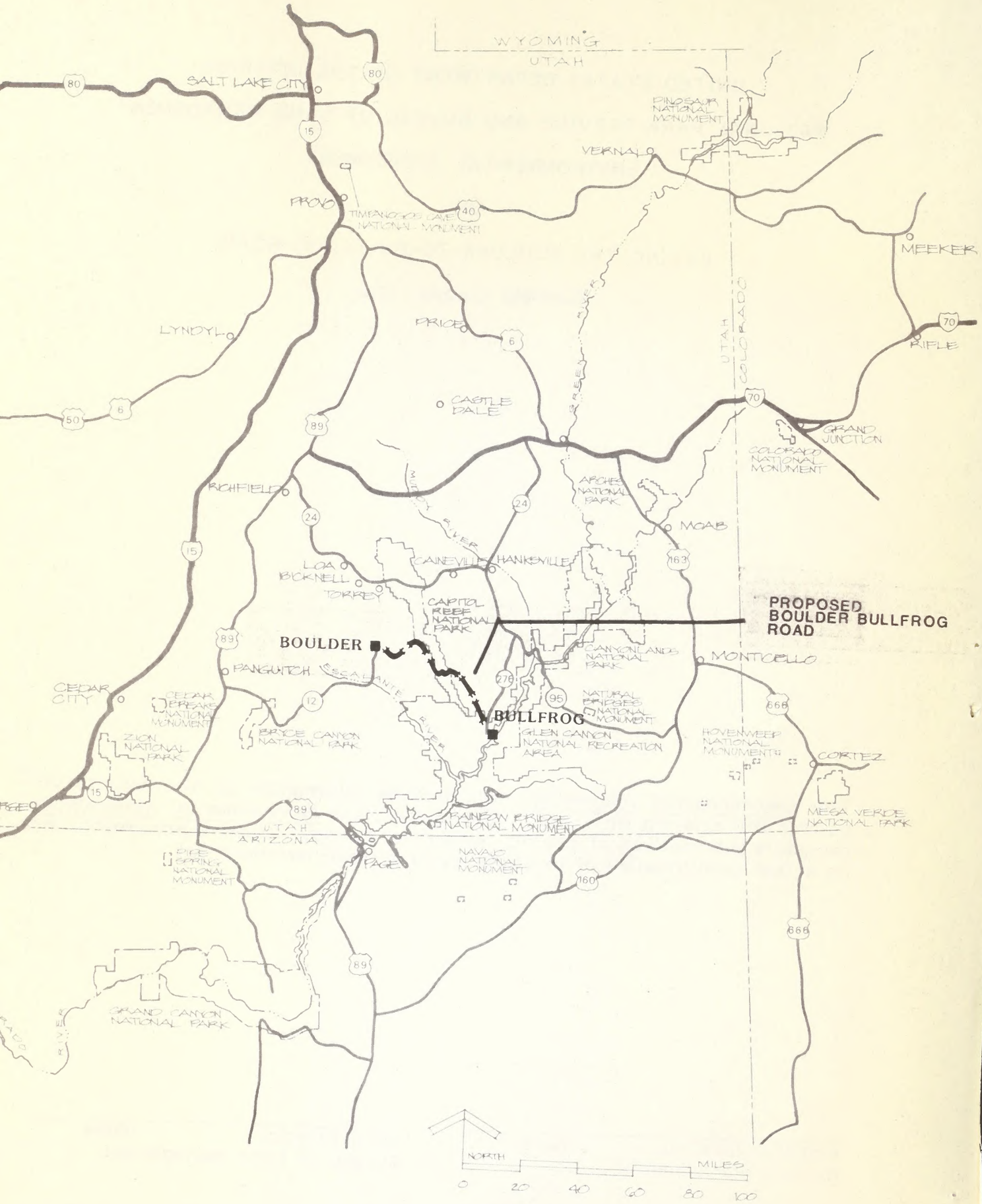
ON

PAVING THE BOULDER-TO-BULLFROG ROAD

Garfield County, Utah

The Environmental Assessment will provide information on the impacts of paving the existing dirt road. Specifically, the Environmental Assessment considers alternatives of paving, gravel surfacing, limited improvement, and no action (continuation of existing levels of road maintenance).

Regional Director Date	State Director Date
National Park Service	Bureau of Land Management



VICINITY

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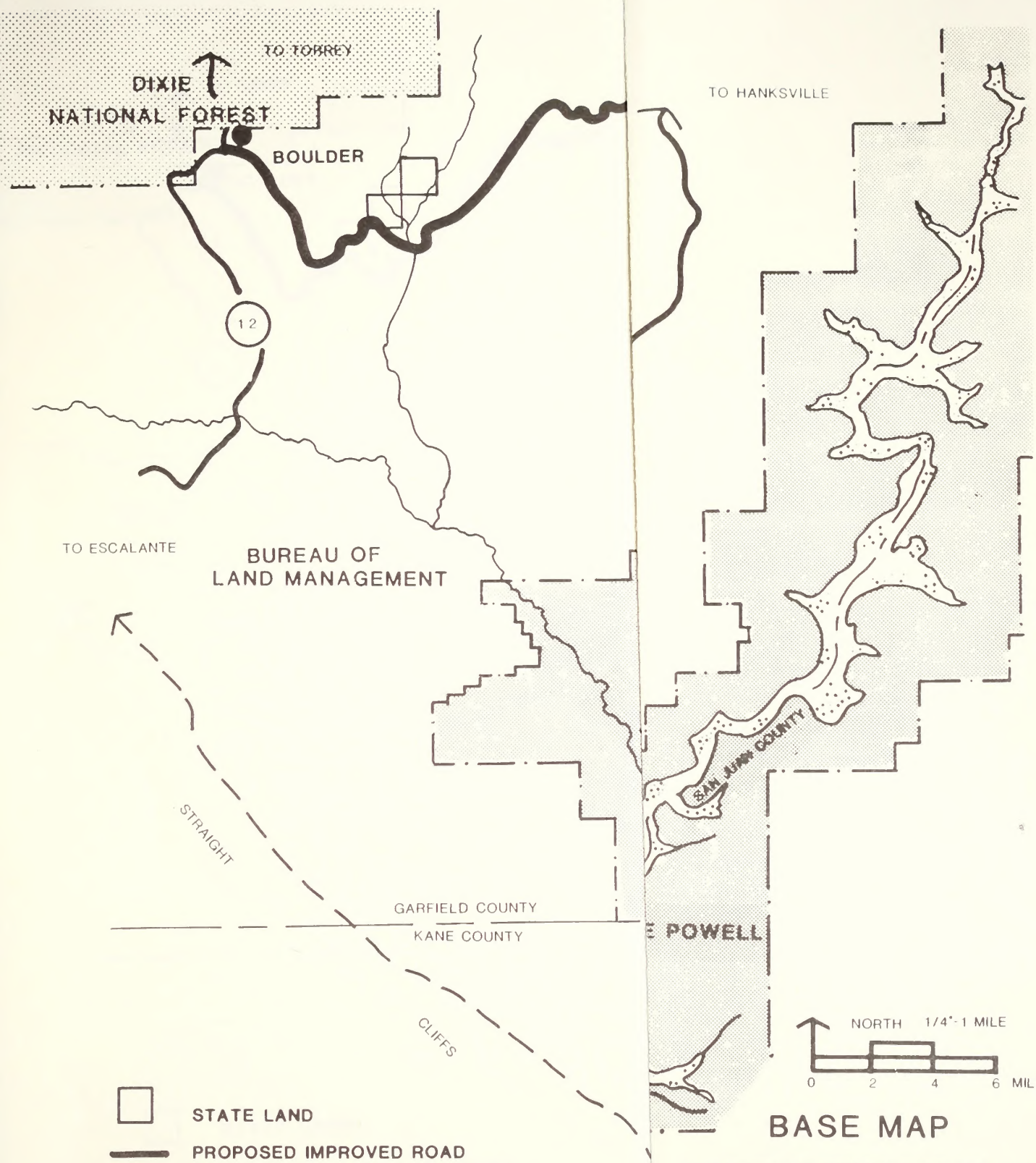

BASE MAP

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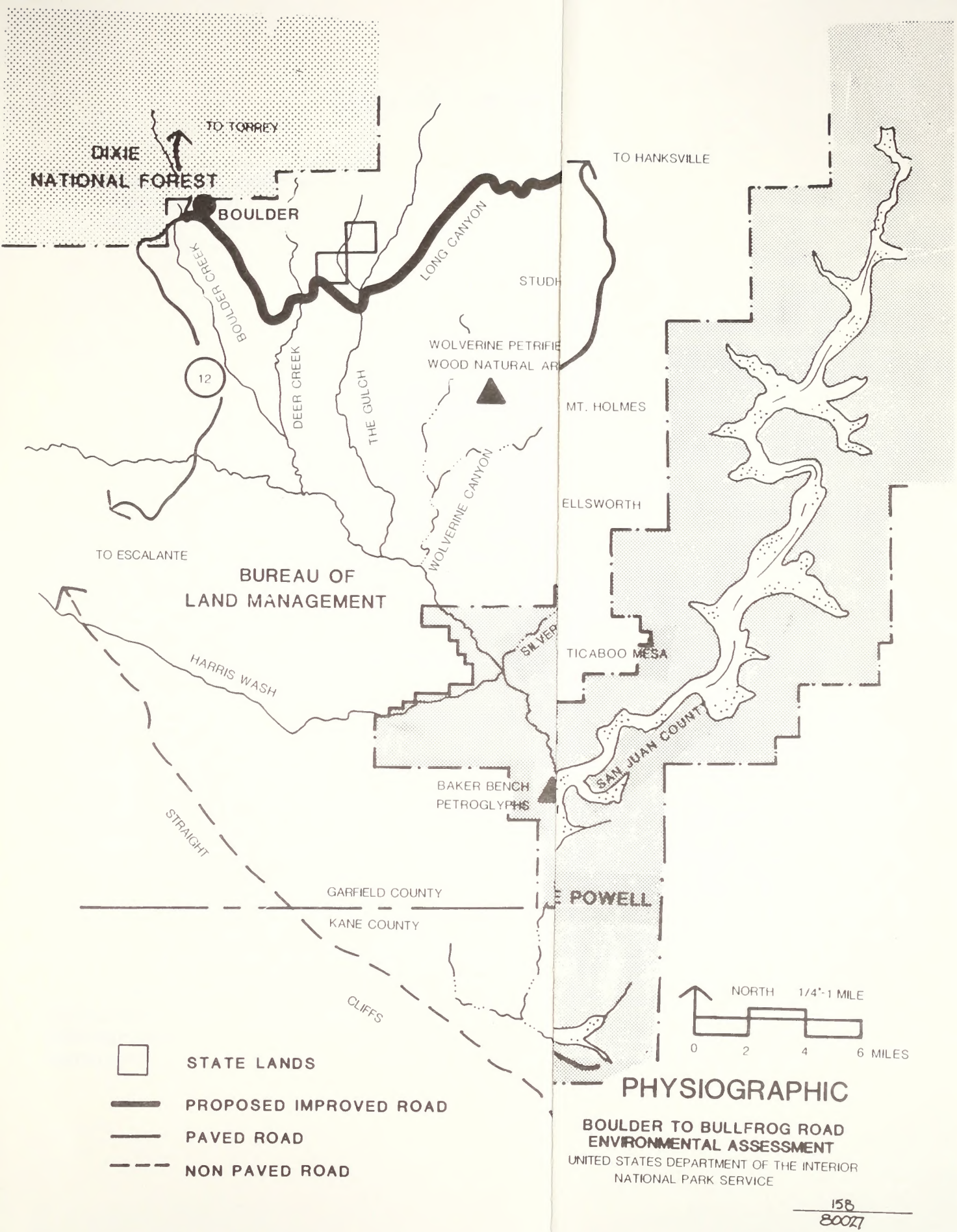

PHYSIOGRAPHIC

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PURPOSE AND NEED FOR ACTION

INTRODUCTION

The Boulder-to-Bullfrog road extends about 66 miles through Garfield County, Utah. Except for about 2½ miles of asphalt pavement just east of the town of Boulder, the road is entirely of gravel and dirt.

Historically, the road has been the primary crossing route over the southerly portion of the Waterpocket Fold, a major physiographic feature of Capitol Reef National Park. Various changes over the years have altered the entire route somewhat, and the present configuration dates from widening that was done in 1967 by the Atomic Energy Commission for uranium hauling and since by Garfield County.

In the seventies and early eighties there were several proposals to upgrade this road. In May 1984 the "Boulder-Bullfrog Scenic Road" Preliminary Engineering report was prepared by Creamer and Noble Engineers and the Five County Association of Governments, proposing to construct an all-weather road on the existing roadway location. This assessment is developed to array for public review the proposal to pave, and to provide additional alternatives for all-weather roads over the existing route.

There is a perceived need on the part of local governmental officials to accommodate increased tourism activity in the region. The construction of an all-weather road between the town of Boulder and the Bullfrog Basin in Glen Canyon National Recreation Area is viewed as an integral step in the completion of the "Grand Circle" tour, a route encompassing most of the frequently-visited park and recreation areas in southern Utah.

Other needs for paving the road have been identified. Certain travel distances for county officials and residents are significantly increased when bad weather and heavy snow closes the Boulder-to-Bullfrog road. Access to medical and educational facilities could be improved. And, occasional law enforcement and rescue situations in isolated areas would be more easily resolved.

Visitor use of the road through Capitol Reef National Park has been documented since 1978. There are also counts for areas near the southern terminus of the Boulder-to-Bullfrog road.

Number of Vehicles Counted Daily

Year	Burr Trail*	Bullfrog Landing**	Halls Crossing**
1978	8	Not available	Not available
1979	5	390	140
1980	7	410	160
1981	7	410	160
1982	5	410	160
1983	14	500	160
1984	13	Not available	Not available

Sources: *Capitol Reef NP
**Creamer-Noble Report

AGENCY RESPONSIBILITIES AND MANDATES

Federal land ownership along the roadway:

Administered by National Park Service (NPS)	
Within Capitol Reef National Park	8.4 miles
Within Glen Canyon National Recreation Area	7.6 miles
Total NPS	16.0 miles
Administered by Bureau of Land Management (BLM)	
From Boulder to the west boundary of Capitol Reef National Park	30.7 miles
From the east boundary of Capitol Reef National Park to the boundary of Glen Canyon National Recreation Area	19.2 miles
Total BLM	49.9 miles
Total NPS and BLM	65.9 miles

There are 6 sections of Utah state lands traversed by the Boulder-to-Bullfrog road. Although the exact lengths of roadway within these sections have not been determined, they are estimated to total between 2 and 3 miles. There are no private lands adjacent to the unpaved portions of the Boulder-to-Bullfrog road.

NATIONAL PARK SERVICE

Two areas administered by the National Park Service (NPS) are directly affected by the proposal to pave the Boulder-to-Bullfrog road. They are Capitol Reef National Park and Glen Canyon National Recreation Area. Both areas are managed in accordance with the Act of August 25, 1916 creating the National Park Service, wherein the Service is directed to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Capitol Reef National Park is within portions of four counties in south-central Utah, and is composed of over 222,000 acres of Federal land and over 19,000 acres of state-owned land. It includes narrow, high-walled gorges cutting through a fault zone called the Waterpocket Fold, forming sandstone cliffs with colorful sedimentary features, often dome-shaped. The portion of the Boulder-to-Bullfrog road in the park has traditionally been known as the Burr Trail.

The General Management Plan (GMP) for Capitol Reef National Park was approved in 1982. The summary of issues and considerations that follows is condensed from the GMP, and from other sources.

1. Mineral resources near the park include tar sand deposits in the Circle Cliffs area, coal deposits in the Henry Mountain area, oil and gas potential from the Overthrust Belt north of the park, and uranium deposits at two locations near the park. Exploitation of these resources may have impacts on the nature and extent of traffic on the Boulder-to-Bullfrog road.

2. Power generation facilities have been proposed at two sites not far from the park. The legislation authorizing expansion of Capitol Reef's boundaries (Act of December 18, 1971) provided for the granting of utility easements and rights-of-way ". . . upon, over, under, across, or along any component of the park . . ." unless ". . . significant adverse effects . . ." would result. There is no use of the Burr Trail section of the Boulder-to-Bullfrog road as a utility corridor at this time.

3. Regarding road improvement (including the Burr Trail), the GMP for the park has this to say: "It is not in the interest of the Park Service to finance improvements of the through-roads in the South and North districts during the lifetime of this plan. Should the county and/or state propose improvements to any of these roads, the Park Service will retain a voice in the design of these roads and in the regulation of traffic on them within the park to protect the park lands, resources, and visitors." The document goes on to say: "Improved roads will retain their existing alignments, with the possible exception of realignment in steep terrain near the park boundary east of The Post." Page 37 of the GMP has more detailed comment on these possible road improvement considerations.

4. The majority of the Boulder-to-Bullfrog road in Capitol Reef National Park passes through a narrow corridor that divides the recommended wilderness area. According to the park's GMP, this wilderness area ". . . contains undeveloped land of primeval character and influence and no permanent improvements or human habitation . . ." and it ". . . will be managed to preserve its natural condition." A change in the road condition and the corresponding increase in use could alter the feeling of solitude and isolation that is associated with the area.

5. The park's GMP discusses the need for NPS facilities in the vicinity of the Burr Trail switchbacks once the visitation increases to warrant this service. These facilities include a ranger station, utility and maintenance area, and well, situated to the east of the Burr Trail switchbacks, and a 10-site dry campground along the road near the western boundary. Paving the road may give impetus to the development of park facilities.

6. In 1984 and 1985 the state of Utah Wildlife Resources Division and Capitol Reef National Park transplanted desert bighorn sheep into the Hall's Creek drainage south of the Burr Trail in accordance with the plans in the GMP. Some of the animals have moved through the area around the switchbacks and along the road.

Glen Canyon National Recreation Area straddles the border between Arizona and Utah. The portion of the national recreation area that includes the road leading to Capitol Reef National Park to the northwest is entirely within Garfield County, Utah. The national recreation area encompasses Lake Powell, which was created by damming the Colorado River.

Bullfrog Basin, the southern terminus of the Boulder-to-Bullfrog road, is a developed area on the shore of Lake Powell, with support facilities for water-oriented recreation. A concession-operated resort is there, including a lodge, trailer village, boat rentals, stores, and restaurants. The Park Service operates a ranger station, a campground, a picnic area, a boat launching ramp, and a landing strip, all in the Bullfrog Basin area.

The Statement for Management for Glen Canyon National Recreation Area was approved in 1981. The following summary of issues and considerations is condensed from that document, and from other sources.

1. The national recreation area is operated by the NPS under an extensive series of cooperative agreements and various legislatively-mandated agreements and permits. A concession contract, issued to Bullfrog Resort and Marina, Inc., provides for visitor services in the Bullfrog area.

2. The Statement for Management for Glen Canyon National Recreation Area expresses concern about future extraction of certain minerals. "The region has rich deposits of coal, oil and gas reserves that to date have not been developed. Intensive development of these resources may become economically feasible and a reality within the next decade, thus changing and intensifying outside the influences on both environmental and social factors affecting the area." Fairly extensive gravel deposits occur in the Bullfrog area. There would undoubtedly be interest in this resource if the the Boulder-to-Bullfrog road proposal is implemented.

3. The concessioner at Bullfrog Basin is under the general management of the Del E. Webb Recreation Properties, Inc. That organization is especially interested in the effects that upgrading the Boulder-to-Bullfrog road would have on patterns of visitor use in the area.

4. The national recreation area's Statement for Management expresses concern about the impacts of increasing tourism in general, e.g. "Increased visitation coupled with easier access to previously unexplored shorelines has resulted in the vandalism and destruction of some cultural resources." Also "There is a need to insure that the area does not become congested to the point that the experience of visitors seeking solitude is jeopardized."

5. When the national recreation area was established, Congress required that ". . . easements and rights-of-way within the recreation area . . ." be granted as long as no significant adverse effects ". . . on administration for recreation purposes" would obtain. At the present time a generating plant at Bullfrog Basin provides electricity for the area. A power plant at Boulder (Garkane Power Co.) apparently has the potential to provide Bullfrog with sufficient power to eliminate the need for the plant there.

BUREAU OF LAND MANAGEMENT

Two Bureau of Land Management districts are directly affected by the Boulder-to-Bullfrog road. They are the Richfield District to the east, and the Cedar City District to the west. Over three-quarters of the roadway traverses the two districts.

Management direction for the BLM is based on the Federal Land Policy Management Act of 1976 (FLPMA). With FLPMA, the national policy was established providing for management under the principles of multiple use and sustained yield.

The BLM's primary management interests relating to the Boulder-to-Bullfrog road are the two Wilderness Study Areas (WSA's) near the roadway. They are the Steep Creek WSA and the North Escalante Canyon/The Gulch Instant Study Area (ISA). Both are in the Escalante Resource Area of the Cedar City District.

Under FLPMA, wilderness preservation is part of BLM's multiple-use mandate, and wilderness values are recognized as part of the spectrum of resource values and uses to be considered during the evaluation period for WSA's. Section 603(c) of FLPMA guides the BLM in managing the lands under wilderness review; "During the period of review of such areas and until Congress has determined otherwise, the Secretary (of the Interior) shall continue to manage such lands according to this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness . . ." For more detailed information, refer to "Interim Management Policy and Guidelines for Lands Under Wilderness Review," BLM, December 1979.

Both the North Escalante Canyon/The Gulch ISA and the Steep Creek WSA have boundaries near the edge of the Boulder-to-Bullfrog roadway.

There are other agency (BLM) concerns. Effects on wildlife (especially game species and bison) if the road is paved are potentially significant. There is a strong likelihood that visitor use patterns would change, having impacts on recreational facilities. Open-range grazing by cattle must be considered. In both the Steep Creek WSA and the North Escalante Canyon/The Gulch ISA, uranium exploration and development could conflict with wilderness designation. And development of tar sand resources is a concern. Reference should be made to the appropriate Land Use Plans (BLM).

The route of the road from Bullfrog to the eastern boundary of Capitol Reef National Park has been designated in The Henry Mountain Management Framework Plan as a travel and utility corridor. The portion of the road from the western boundary of the park to the town of Boulder is covered by the Escalante Management Framework Plan; however, the plan does not address activities relating to the Boulder-to-Bullfrog road.

STATE OF UTAH

The state of Utah owns six sections of land that include portions of the Boulder-to-Bullfrog Road. Two sections encompass environmentally critical portions of the road; in Capitol Reef National Park the Burr Trail switchbacks are on state land, and in the Escalante Resource area (BLM) some of the roadway through Long Canyon is state owned.

These lands are subject to the provisions of the Act of December 18, 1971 which states that ". . . lands or interest therein owned by the State of Utah . . . may be acquired only with the approval of . . ." the state. In 1981 the state initiated a land exchange proposal ("Project BOLD") with the Federal government that would combine scattered land sections into more managable units. If exchanges take place as visualized in the most recent discussion draft (1983) of Project BOLD legislation, all state sections through which the Boulder-to-Bullfrog road crosses would become Federal lands (BLM and NPS).

The state of Utah has generally supported improvements to the Boulder-to Bullfrog road, including recent funding of about $600,000 for engineering studies, contingent on Federal matching funds. Possible state interests and influences could include:

1. Possible input by the Utah Department of Transportation regarding design of an improved roadway.

2. Future maintenance responsibilities for the road.

3. Constraints placed on the scope of the proposed project by resource agencies such as the Utah State Division of Wildlife Resources.

4. Leases or other commercial or non-commercial uses the state may place on their lands adjacent to the Boulder-to-Bullfrog road.

GARFIELD COUNTY AND OTHER SOUTHERN UTAH COUNTIES

Garfield County is a member of the Five County Association of Governments. Although the county owns no land along the Boulder-to-Bullfrog road, its interests are considerable there. The county maintains the entire length of the road and it may continue to do so if the road is paved. The county's concerns are perhaps best stated in the following quote extracted from the Creamer-Noble report.

> The proposed central link of the Grand Circle Adventure in Utah is a slow speed all-weather scenic road from the town of Boulder to Bullfrog Basin on Lake Powell. This scenic road would provide access to the canyon country of Southern Utah which has previously been limited due to frequent poor road conditions. Combined with the new Lake Powell ferry boat transportation system, funded by the Congress and the State of Utah in 1984, the Boulder-Bullfrog scenic road would provide tourists year-round access to the wonders of the Grand Circle canyon country.
>
> An additional benefit derived from improving the Boulder-Bullfrog scenic road is the economic improvement it will offer residents of Garfield County. While the benefit is considered secondary to the overall project, it is one of primary concern to Garfield County and to the state of Utah. The increased tourism generated in Garfield County by an all-weather road will play a substantial role in providing new employment positions in an area plagued by high unemployment.

GENERAL ISSUES

1. Desert conditions generally prevail near the Boulder-to-Bullfrog road. Consequently, road construction and improvement proposals must take into account highly erodible soils, inadequate ground water supplies, fragile vegetative growth, and occasionally temperature extremes.

2. Human occupation of the Waterpocket Fold area began over a thousand years ago. A succession of American Indian groups left petroglyphs and other cultural evidence of their presence. There are a number of such cultural sites located near the Boulder-to-Bullfrog road, but a complete archeological survey of the area is lacking.

3. An improved Boulder-to-Bullfrog roadway would probably require increased attention by all agencies to patrol activities for visitor safety and for law enforcement.

4. Threatened and endangered species occur in the area. The NPS and BLM reflect a management stance wherein all adverse impacts to these plant and animal species will be avoided.

5. Air quality of the region is high. Capitol Reef National Park is a Class I area under the Clean Air Act. Fugitive dust is an existing impact and a potential issue.

6. The remote, rather primitive nature of the existing Boulder-to-Bullfrog road and adjacent lands has caused some concern about impacts on "wilderness values." A clear understanding is needed of the relationship that a paved road would have to "wilderness." Later, this assessment also raises this issue as it relates to specific wilderness proposals.

ALTERNATIVES

OVERVIEW OF ALTERNATIVES

The following is a brief description of the alternatives considered for detailed analysis. A table comparing the engineering considerations for all the alternatives follows this overview.

Alternative I-a. Pave entire route. This is the project as advocated by the Five County Association of Governments. The road would be paved for its entire 66-mile length. It would be designed as a scenic road only, with a 10 to 40 mile per hour speed limit, and would follow the existing alignment except in areas where safety and design criteria dictate otherwise.

Alternative I-b. Pave entire route. This would be the project similar to Alternative I-a, but as envisioned by engineers from the Federal Highway Administration. Some conceptual and engineering differences exist between the two subalternatives, and will be discussed.

Alternative II. Gravel entire route. This alternative is essentially the same as I-b, except that the road would be gravel-surfaced rather than paved.

Alternative III. Limited improvement. Under this alternative, the road would not be paved, but would receive enough improvement to make it passable for two-wheel-drive vehicles approximately 90 percent of the time. It would involve increasing the gravel base in several places and installing culverts and paved dips where necessary. One bridge and one realignment segment would be included.

Alternative IV. No action. In this alternative, no major paving or other improvements would be done. Garfield County would continue existing levels of maintenance, including its limiting paving program. The road would remain nearly impassable during wet weather, and the Bullfrog Creek crossing would continue to be periodically inundated by Lake Powell.

ALTERNATIVE CONSIDERED BUT ELIMINATED

There were preliminary discussions on an alternative to meet the perceived objectives of paving the Boulder-to-Bullfrog road by improving another road or roads. For example, paving the Notom Road would complete a loop with the recently-paved Boulder/Grover Road and U-24. However, while discussion of this proposed alternative is potentially valid, it does not answer the immediate need to analyze the environmental consequences of the proposed paving of the Boulder-to-Bullfrog road.

COMPARISON OF ALTERNATIVES - BOULDER-TO-BULLFROG ROAD - ENGINEERING CONSIDERATIONS

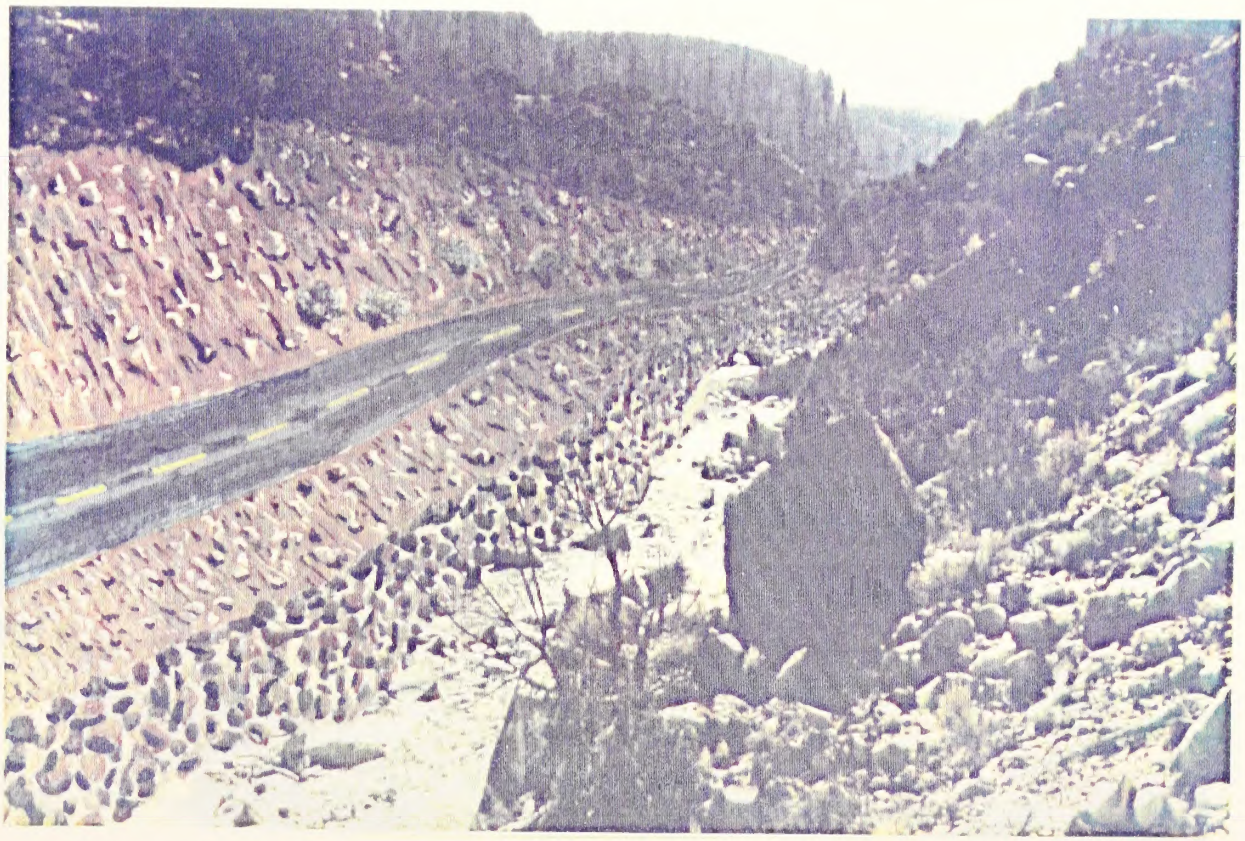
Alternative	Road Surface	Road Width	Design Speed	Realignments	Grades
I-a Pave entire route	Bituminous	26 feet	30-40 mph (15-20 at switchbacks)	The Gulch (extensive) Muley Twist Wash (minor) Near east boundary of Capitol Reef NP (extensive)	Maximum 8% exceptions: Approach to The Gulch - 10½% Long Canyon - 9% Between Long Canyon & Horse Canyon - 10% Switchbacks - 11-13%
I-b Pave entire route	Bituminous	26 feet (20'+ on switchbacks)	30-40 mph (15-20 at The Gulch & Muley Twist Wash, and 5-10 mph at switchbacks)	The Gulch (extensive) Muley Twist Wash (minor) Halls Creek (minor) Near east boundary of Capitol Reef NP (extensive)	Maximum 8% exceptions: Approach to The Gulch - 10-11% Long Canyon - 8-10% Between Long Canyon & Horse Canyon - 9-10% Switchbacks - 11-13% Deer Creek valley & Muley Twist Wash (portion) - 8-10%
II Gravel entire route	Gravel	26 feet (20'+ on switchbacks)	As I-b	As I-b	As I-b
III Limited improvement	Gravel and dirt	Retain existing widths	20-35 mph (5-10 mph at The Gulch, Muley Twist Wash, & Switchbacks)	Near east boundary of Capitol Reef NP (extensive)	Retain existing grades
IV No action	Gravel and dirt	Retain existing widths	20-35 mph (less at many locations)	None	No changes

COMPARISON OF ALTERNATIVES - BOULDER-TO-BULLFROG ROAD - ENGINEERING CONSIDERATIONS

Alternative	Bridge Locations	Total Bridge Length*	Other Drainage Features
I-a Pave entire route	Deer Creek The Gulch Horse Canyon Muley Twist Halls Creek Bullfrog Creek	50 feet 120 feet 40 feet 50 feet 50 feet 150 feet	Culverts in several drainages; slotted drains on switchbacks
I-b Pave entire route	Deer Creek The Gulch Horse Canyon Muley Twist Halls Creek Bullfrog Creek	120 feet 150 feet 100 feet 85 feet 135 feet 215 feet	Culverts in several drainages; paved (concrete) ditch with inner curb on switchbacks
II Gravel entire route	As I-b	As I-b	As I-b
III Limited improvement	Bullfrog Creek Retain existing wooden bridge at Horse Canyon	215 feet	Paved dips or culverts in drainage crossings
IV No action	Retain existing wooden bridge at Horse Canyon	--	Continue existing levels of repair and improvement on drainage devices

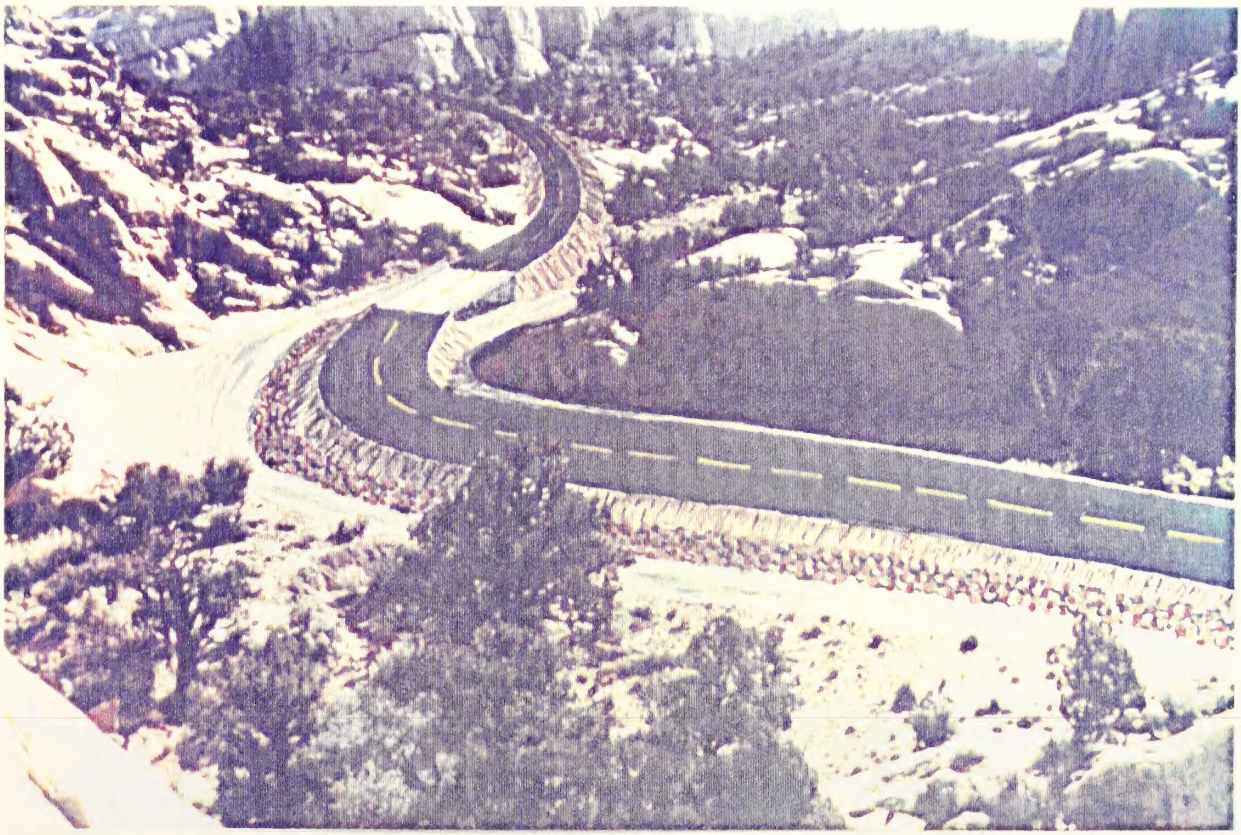
*Total bridge lengths are based on runoff data that are preliminary only. Considerable engineering work would be required before precise bridge specifications can be developed.

The existing road in Long Canyon follows a narrow, spectacular route just west of Circle Cliffs.



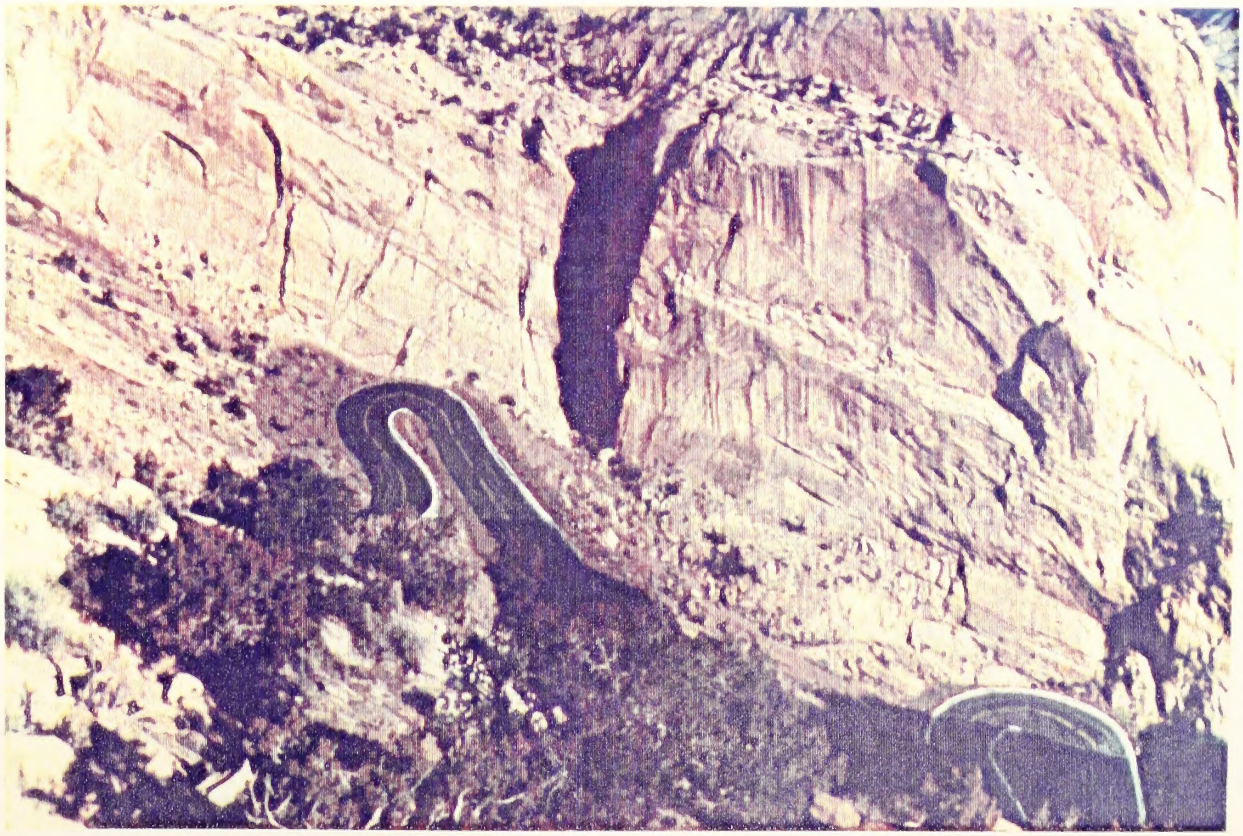
Under Alternative I, the road through Long Canyon would require substantial reconstruction to accommodate both the roadway and the stream channel within the narrow confines of the canyon walls.

Muley Twist Wash is a torturous route through the Waterpocket Fold. At times the present road is in the bottom of the stream bed.

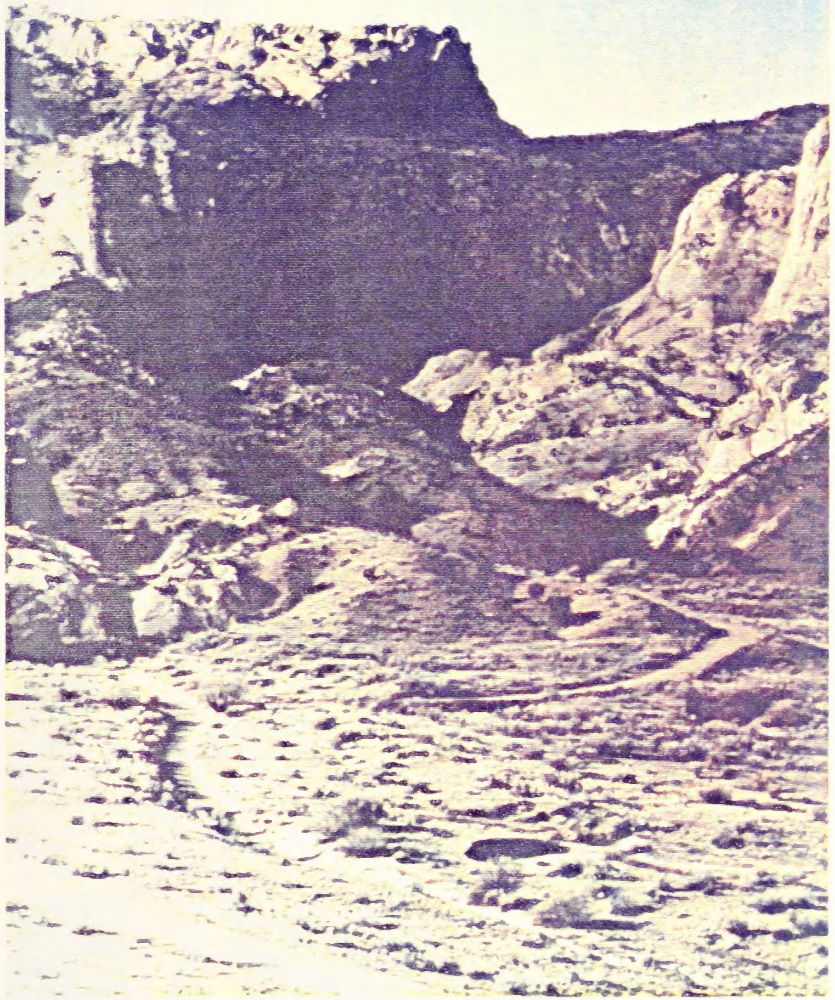


Alternative I proposes bridging Muley Twist Wash and armor-plating the road to preserve the drainage channel and protect the road.
Option: No bridge; rechannel stream bed.

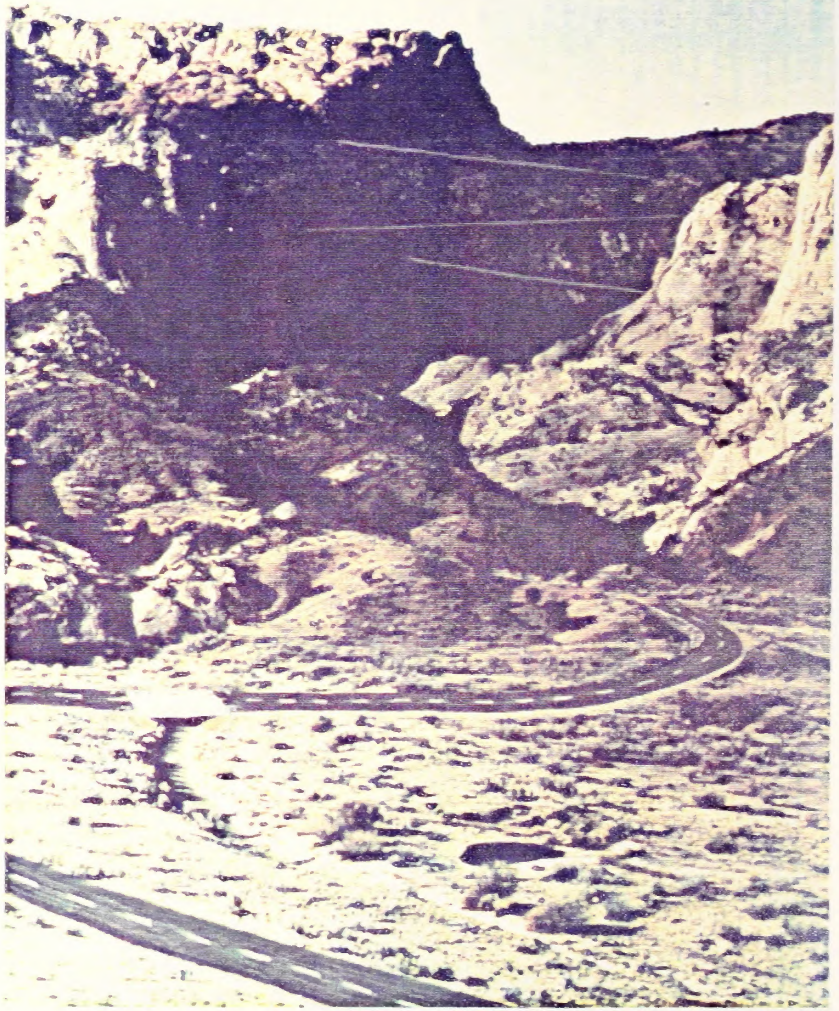
The switchbacks on the east face of Waterpocket Fold are probably the most prominent feature of the Boulder-to-Bullfrog road.



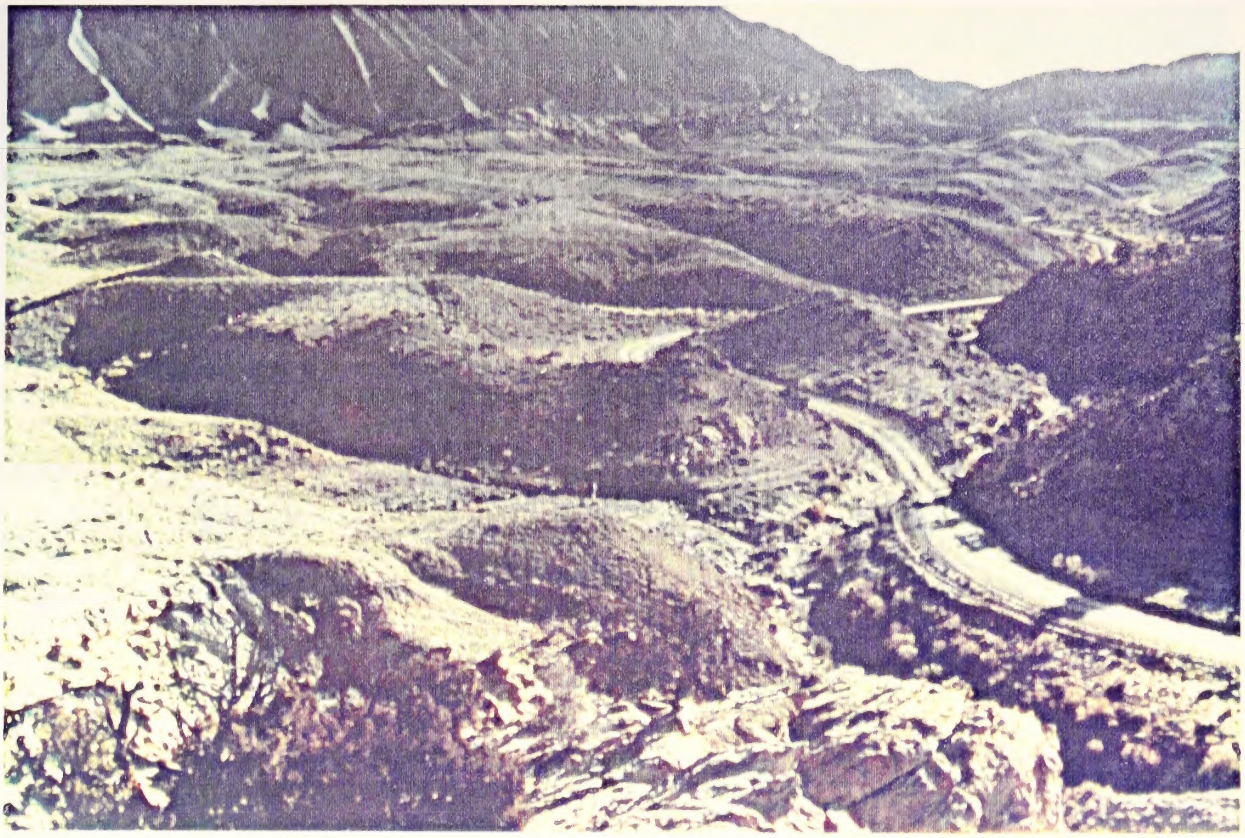
Under Alternative I the "Burr Trail" switchbacks could only receive minimal widening and the steep grade would have to be maintained. Except for paving, this would be true for all other alternatives.



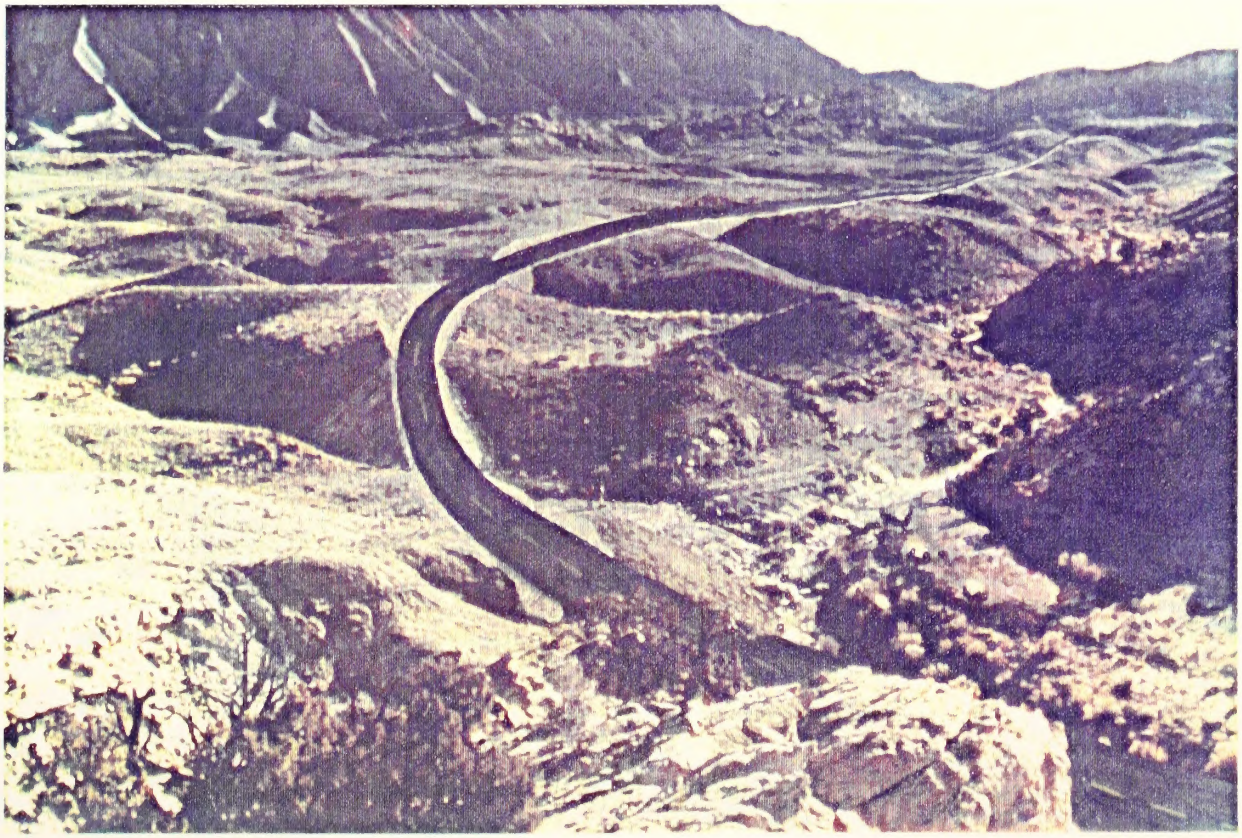
The existing road crosses Halls Creek and offers an imposing approach to the "Burr Trail" crossing of the Waterpocket Fold.



Under Alternative I, a bridge is proposed over Halls Creek, and the switchbacks up the Waterpocket Fold would be much more prominent.

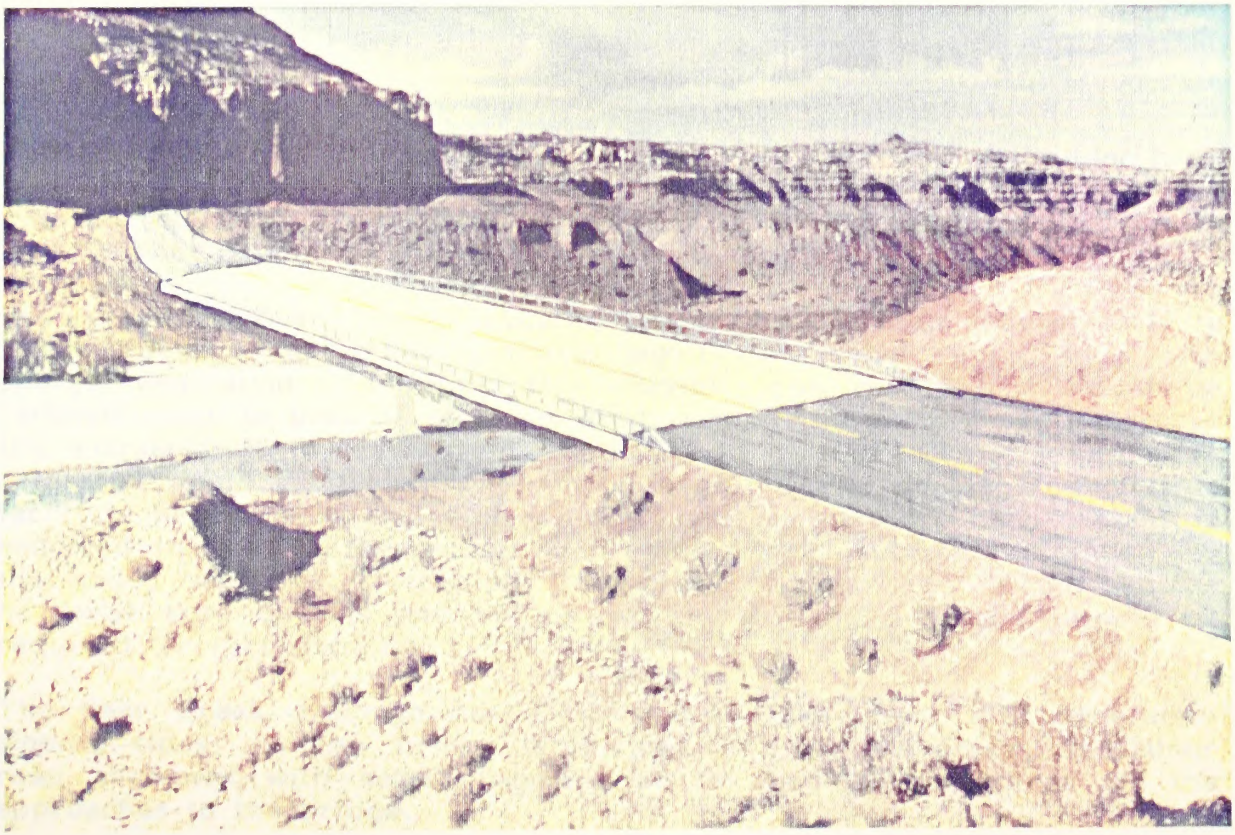


Within Capitol Reef National Park, the existing road follows Halls Creek, crossing it several times.



Alternative I proposes to realign over a mile of roadway to avoid stream crossings and flooding associated with Halls Creek. Alternatives II and III propose similar realignment without pavement.

The existing road crossing at Bullfrog Creek is subject to flooding whenever Lake Powell reaches flood pool level.



Alternative I proposes a substantial bridge at Bullfrog Creek. A bridge is also proposed here for Alternatives II and III.

DESCRIPTION OF THE ALTERNATIVES

Alternative I-a and I-b. Pave entire route

The concept is for a low speed (about 30 to 40 miles per hour) paved scenic road with a typical 26-foot roadbed. There would be sections in areas where maximum safe speeds could be as low as 5 or 10 miles per hour. See the Appendix for engineering and design concepts.

For descriptive purposes, the road has been divided into four sections:

Section 1. The roadway from the town of Boulder to the west boundary of Capitol Reef National Park.

Section 2. The roadway within Capitol Reef National Park.

Section 3. The roadway from the east boundary of Capitol Reef National Park to the west boundary of Glen Canyon National Recreation Area.

Section 4. The roadway within Glen Canyon National Recreation Area.

Alternative I-a. Pave entire route

This is the proposed action by the Five County Association of Governments prepared by Creamer and Noble Engineers.

Section 1

About 2.7 miles of the Boulder-to-Bullfrog road just east of Boulder have been paved for light vehicle traffic to an average width of 21 feet. This was accomplished by Garfield County, and they intend to continue to improve that portion of the road in the future.

Beyond the pavement the roadway continues about 4 miles southeasterly to Deer Creek. The terrain consists mainly of gently rolling hills with sparse vegetation. Through this section, the road prism would be reconstructed to provide an even grade and would be widened to accept the standard 26-foot pavement section. In this area, two major wash crossings would require installation of large diameter drainage culverts to facilitate proper drainage. In addition, several smaller culverts would be required in selected areas and to provide proper subgrade drainage for the paved section. Throughout this area, reconstruction would require no large cuts or fills and no clearing of existing vegetation would be required for reconstruction.

The Deer Creek drainage has a fairly wide valley floor with moderately sloping sides. A new bridge is planned to cross the creek, and minor road alignment with some placement of fill would be required for the approaches to the bridge.

The roadway then climbs out of the Deer Creek drainage and traverses for 4 miles to another area of rolling hills and flat lands. The existing

road follows the contour of the ground, resulting in an undulating roadway. To alleviate this problem, the road subgrade would be reconstructed using cuts and fills in order to improve the overall road gradient. The subgrade would be widened to accept the new wider roadway pavement section of 26 feet. Small culverts would be installed in many of the fill areas to provide passage under the roadway for drainage.

There are no large washes or major drainage paths which cross the roadway in this area until the road descends into the bottom of The Gulch via a proposed bridge. At the approach to The Gulch, major road realignment would be required to improve safety. Substantial rock cuts and fills would be required along the road subgrade in The Gulch area; only moderate excavation would be necessary elsewhere. There would be no clearing of vegetation required in order to accommodate the road in this section.

After crossing the stream in the bottom of The Gulch, the roadway climbs about 6 miles through the bottom of Long Canyon, a steep, high-walled canyon. It is characterized by vertical red sandstone cliffs up to 200 feet high and a narrow valley ranging in width from 300 feet to one-half mile. This section of road would require significant reconstruction to widen, realign, and elevate the road prism out of the immediate flood zone. The major design challenge through this section would be to accommodate both the roadway and the flood channel within the narrow confines of the canyon walls. To improve grades and widen the subbase of the existing road, it would be necessary to perform large scale channel improvements to provide proper drainage and flood protection through the canyon. Cuts and fills would be required in some areas to form a channel for the drainage water and to improve horizontal and vertical alignment of the existing road. Clearing of some vegetation would be required. Riprap protection of the road fill would be necessary to prevent flood damage.

From the head of Long Canyon the roadway enters the Circle Cliffs basin and follows a steep grade downward for about 1½ miles along a slope into the valley bottom. Side slopes in the area are steep and severe and would require some bank-cut construction to widen the existing roadway. Soils through this area are fairly poor clays, and the vegetation on the Horse Canyon valley floor, a major drainage, is mainly scattered brush. A bridge is planned here.

Thereafter, the road passes through rolling hills and gentle terrain to the border of Capitol Reef National Park, a distance of approximately 13 miles. Road grades and side slopes are mild, and vegetation near the roadway is sparse. Some small cuts and fills would be required to balance the grade along the roadway in the more hilly areas. At selected sites fills have been planned in order to raise the grade of the roadway sufficiently to provide proper drainage and eliminate flooding problems. As the road nears the park boundary, there would be some widening of the presently tight horizontal curves for safety purposes.

Section 2

The Boulder-to-Bullfrog road enters Capitol Reef National Park at its westerly boundary. The road (known here as the Burr Trail) proceeds from the boundary to the top of Waterpocket Fold. The road follows the top of a ridge and overlooks the scenic Waterpocket Fold, which is also the trailhead for the Muley Twist Canyon trail system. It traverses rolling hills which slope into the fold. Reconstruction on this 3-mile length of road to the Muley Twist drainage would be done within the existing roadway alignment. The subgrade would be widened and reconstructed to provide a smooth and even grade. In this section, all materials for construction would be brought in from outside the National Park, and excess excavation material, if any, would be removed from the park for disposal.

There are two major drainage crossings of the Muley Twist Wash located at the top of Waterpocket Fold in the Muley Twist drainage. Here, earthwork consisting of a series of cuts and fills, and a bridge, would be used through the Muley Twist Wash crossing in order to preserve the drainage channel and properly protect the road from flooding.

The road then proceeds for about 2 miles from the top of Waterpocket Fold to the junction of the Notom road and the Burr Trail Road. From the top of Waterpocket Fold, the road consists of a series of steep switchbacks with an average roadway width of approximately 20 feet. Grades are increased to 10 to 14 percent in this section and side slopes are steep. In this switchback area, the road would be reconstructed following the existing roadway prism. The roadway would be widened in narrow segments and at the switchbacks wherever possible in order to allow bus and truck traffic along the road. Because major realignment of the road is not possible, the existing steep grade along this road would be maintained. Slotted drains could be installed underground (in place of ditches) on the inside portion of the roadway, permitting the entire width of the road to be paved. A barrier would be installed outside of the roadway for safety purposes, and the road would be signed for 10 mph maximum speed. In order to maintain the standard width and widen the turns along the switchbacks, rock excavation would be required. The bedrock above the road is not stable. Culverts would be installed at the lower elevations in Waterpocket Fold to provide proper drainage for those areas.

The only major drainage crossing in the area is at Halls Creek at the foot of the Fold, where a bridge is proposed. Once to the bottom of the Fold, the terrain becomes much flatter; grades and side slopes along the road are mild.

From the junction of the Notom Road and the Burr Trail, the roadway proceeds for 5 miles to the eastern boundary of Capitol Reef National Park. The roadway from the Notom Road/Burr Trail junction to The Post would need little preparation, as the present road width through this area is 30 feet. Although there are no major drainage problems through this area, the road grade elevation is low through some spots and would require filling in order to provide proper drainage of the roadway. There would need to be some channelization of Hall's Creek for a distance

road follows the contour of the ground, resulting in an undulating roadway. To alleviate this problem, the road subgrade would be reconstructed using cuts and fills in order to improve the overall road gradient. The subgrade would be widened to accept the new wider roadway pavement section of 26 feet. Small culverts would be installed in many of the fill areas to provide passage under the roadway for drainage.

There are no large washes or major drainage paths which cross the roadway in this area until the road descends into the bottom of The Gulch via a proposed bridge. At the approach to The Gulch, major road realignment would be required to improve safety. Substantial rock cuts and fills would be required along the road subgrade in The Gulch area; only moderate excavation would be necessary elsewhere. There would be no clearing of vegetation required in order to accommodate the road in this section.

After crossing the stream in the bottom of The Gulch, the roadway climbs about 6 miles through the bottom of Long Canyon, a steep, high-walled canyon. It is characterized by vertical red sandstone cliffs up to 200 feet high and a narrow valley ranging in width from 300 feet to one-half mile. This section of road would require significant reconstruction to widen, realign, and elevate the road prism out of the immediate flood zone. The major design challenge through this section would be to accommodate both the roadway and the flood channel within the narrow confines of the canyon walls. To improve grades and widen the subbase of the existing road, it would be necessary to perform large scale channel improvements to provide proper drainage and flood protection through the canyon. Cuts and fills would be required in some areas to form a channel for the drainage water and to improve horizontal and vertical alignment of the existing road. Clearing of some vegetation would be required. Riprap protection of the road fill would be necessary to prevent flood damage.

From the head of Long Canyon the roadway enters the Circle Cliffs basin and follows a steep grade downward for about 1½ miles along a slope into the valley bottom. Side slopes in the area are steep and severe and would require some bank-cut construction to widen the existing roadway. Soils through this area are fairly poor clays, and the vegetation on the Horse Canyon valley floor, a major drainage, is mainly scattered brush. A bridge is planned here.

Thereafter, the road passes through rolling hills and gentle terrain to the border of Capitol Reef National Park, a distance of approximately 13 miles. Road grades and side slopes are mild, and vegetation near the roadway is sparse. Some small cuts and fills would be required to balance the grade along the roadway in the more hilly areas. At selected sites fills have been planned in order to raise the grade of the roadway sufficiently to provide proper drainage and eliminate flooding problems. As the road nears the park boundary, there would be some widening of the presently tight horizontal curves for safety purposes.

Section 2

The Boulder-to-Bullfrog road enters Capitol Reef National Park at its westerly boundary. The road (known here as the Burr Trail) proceeds from the boundary to the top of Waterpocket Fold. The road follows the top of a ridge and overlooks the scenic Waterpocket Fold, which is also the trailhead for the Muley Twist Canyon trail system. It traverses rolling hills which slope into the fold. Reconstruction on this 3-mile length of road to the Muley Twist drainage would be done within the existing roadway alignment. The subgrade would be widened and reconstructed to provide a smooth and even grade. In this section, all materials for construction would be brought in from outside the National Park, and excess excavation material, if any, would be removed from the park for disposal.

There are two major drainage crossings of the Muley Twist Wash located at the top of Waterpocket Fold in the Muley Twist drainage. Here, earthwork consisting of a series of cuts and fills, and a bridge, would be used through the Muley Twist Wash crossing in order to preserve the drainage channel and properly protect the road from flooding.

The road then proceeds for about 2 miles from the top of Waterpocket Fold to the junction of the Notom road and the Burr Trail Road. From the top of Waterpocket Fold, the road consists of a series of steep switchbacks with an average roadway width of approximately 20 feet. Grades are increased to 10 to 14 percent in this section and side slopes are steep. In this switchback area, the road would be reconstructed following the existing roadway prism. The roadway would be widened in narrow segments and at the switchbacks wherever possible in order to allow bus and truck traffic along the road. Because major realignment of the road is not possible, the existing steep grade along this road would be maintained. Slotted drains could be installed underground (in place of ditches) on the inside portion of the roadway, permitting the entire width of the road to be paved. A barrier would be installed outside of the roadway for safety purposes, and the road would be signed for 10 mph maximum speed. In order to maintain the standard width and widen the turns along the switchbacks, rock excavation would be required. The bedrock above the road is not stable. Culverts would be installed at the lower elevations in Waterpocket Fold to provide proper drainage for those areas.

The only major drainage crossing in the area is at Halls Creek at the foot of the Fold, where a bridge is proposed. Once to the bottom of the Fold, the terrain becomes much flatter; grades and side slopes along the road are mild.

From the junction of the Notom Road and the Burr Trail, the roadway proceeds for 5 miles to the eastern boundary of Capitol Reef National Park. The roadway from the Notom Road/Burr Trail junction to The Post would need little preparation, as the present road width through this area is 30 feet. Although there are no major drainage problems through this area, the road grade elevation is low through some spots and would require filling in order to provide proper drainage of the roadway. There would need to be some channelization of Hall's Creek for a distance

of 200 feet in two locations and riprap along the roadway to protect the road surface.

The roadway from The Post south to the park boundary generally follows the course of Halls Creek. In one 6,000-foot section, the road crosses the drainage path eight times. In order to alleviate this problem, an option would call for realignment of about 6,000 feet of roadway along rolling terrain northeast of the existing road. This realignment of the road would extend laterally a maximum of 500 feet from the existing roadway in a parallel configuration. This new alignment would require some medium construction equipment and methods. With the exception of this realignment, all work within the park would be done following the existing roadway. The existing roadway, where abandoned, would be restored back to natural condition.

Section 3

After leaving the east boundary of Capitol Reef National Park, the Boulder-to-Bullfrog road runs southeasterly about 19 miles to the north boundary of the Glen Canyon National Recreation Area. Through this section the roadway traverses the high desert country which is common in southern Utah, and is characterized by flat rolling hills with occasional deep gorges cut by wind and water. The Bureau of Land Management administers the land in this area.

The roadway proceeds from Capitol Reef National Park to what is known as the Stratton Road section. Through this area the roadway is constructed on generally flat to rolling hill country. Grades and side slopes are generally mild to moderate. For the most part, the existing alignment of the road is acceptable and would require no realignment; however, realignment may be required in some areas to improve sight distances and to eliminate sharp curves. These realignments would be of a minor nature; however, some reconstruction would be necessary to flatten the road grade. The subgrade would require widening to the standard road width selected. Cuts, fills, and drainage earthwork through this section of road would be minor, as no major drainage channels are located along the road. Minor draws and drainage areas would be accommodated by the installation of drainage culverts under the road.

From the Stratton Road junction to the boundary of the Glen Canyon National Recreation Area the roadway takes on a somewhat different character. In 1967 the Utah Department of Transportation issued a contract to improve grades and drainages along this portion of the roadway. As a result, the present grades in the area are acceptable and would require little reconstruction except for widening in selected areas. Drainage culverts were installed in all major drainages throughout this region. However, because of the highly corrosive soils present there, approximately 50 percent of these culverts are in poor repair and would require complete replacement. Those which are usable would require extensions to accommodate the wider subgrade that is planned. The present subgrade along this part of the roadway has average widths of approximately 30 feet along fill areas and approximately 38 feet in cut

areas. It is anticipated that little major earthwork would be required for this section of road. However, it would be necessary to import free-draining base material to enhance structural capacities over the predominent clay soils.

Section 4

As the Boulder-to-Bullfrog road enters Glen Canyon National Recreation Area and proceeds along a mesa west of Bullfrog Creek Canyon, the terrain begins to undergo subtle changes. Although the countryside is still generally flat or gently rolling, the high plateaus are cut by increasingly deeper and more rugged sandstone canyons as the road approaches Lake Powell. Reconstruction of the subgrade in this area would require minor earthwork and realignment of the roadway surface. Minor widening of the subgrade would be accomplished; the present subgrade is 30 feet wide in both cut and fill areas. Culverts are in place and would require extensions on both sides in fill areas to provide adequate drainage.

The crossing at Bullfrog Creek becomes impassable whenever Lake Powell reaches flood pool level. A major bridge structure would be constructed here.

After crossing Bullfrog Creek, the roadway parallels the shore of Lake Powell across relatively flat terrain for a distance of approximately 5 miles. In this section of road, there is one major side canyon draining into Lake Powell. A 14-foot multi-plate pipe has previously been installed for drainage. However, this structure would require a 20-foot extension on each side as the road is widened. The road alignment and grade in this section are generally good. However, there is one tight horizontal curve within the section which would be improved with a slight realignment. This is considered one of the more dangerous points on the road, and realignment around the curve would substantially improve safety.

Guardrails have been installed along the road through the national recreation area. As the roadway section is widened, the guardrails would need to be removed and replaced. Some salvage and reuse of the guardrail sections may be possible.

With the exception of the horizontal curve realignment mentioned previously, the road would be reconstructed entirely within the existing roadway prism. It is probable that only light construction would be required to widen the road subgrade. Because of the sandy soils in the area and the relative isolation of this section, some existing cut and fill slopes have deteriorated with time. These slopes would be reshaped and regraded as the roadway is reconstructed. The proposed reconstruction of the Boulder-to-Bullfrog road would end at the intersection with Highway 276, just north of the Bullfrog Basin developed area.

The Preliminary Engineering Report (Creamer and Noble) states that ". . . the typical pavement section for the major portion of the roadway length (is) to be comprised of 3 inches of bituminous surface course, 4

inches of untreated base course, and 6 inches of granular borrow." See the Appendix for typical roadway sections. The disturbed zone for road construction purposes, including the pavement, shoulders, drainage ditches, and adjacent modified slopes, would vary in width depending on the terrain and construction conditions encountered. The impacted zone could range from 50 feet to about 150 feet; an average of 100 feet is assumed for the purposes of this assessment.

Garfield County claims an existing right for use and maintenance of the present road. Activities considered to be within the purview of normal maintenance would be covered by that right which pre-dates FLPMA, the BLM Wilderness Study Policy, and the BLM Interim Management Policy. Therefore, reasonable reconstruction and maintenance activities could occur under prior existing right.

The Creamer and Noble report also includes a preliminary investigation of potential sources of aggregate. They reported that ". . . the investigation has shown that on both ends of the project substantial amounts of aggregate of excellent quality are available. On the interior of the project, another excellent aggregate source was located on the Bullfrog Creek drainage." (Note: This is at Eggnog, about 5 miles east of the Boulder-to-Bullfrog road on BLM land. Those sources at each end of the Boulder-to-Bullfrog road are near the town of Boulder and along Bullfrog Creek in the Glen Canyon National Recreation Area.) "At this site, the quality of the aggregate material is such that only granular borrow could be obtained." The report goes on to say that "a more detailed investigation will be made as the project enters into design."

Discussions with a Creamer and Noble engineer indicate that possible sites for batch plants include Eggnog and the town of Boulder. For construction camps, Eggnog and White Flat were mentioned. Site selection would depend primarily on the needs of the selected construction contractor. The Boulder town site is on private lands; Eggnog and White Flat are on lands administered by the BLM. The contractor would have to arrange for use of these sites.

Alternative I-b. Pave entire route

This is the Federal Highway Administration's engineering concept of the paving alternative. Refer to Alternative I-a for a basic description of the roadway, and to the Appendix for specifics on construction technique definitions and typical road sections. See the Comparison of Alternatives chart before the description of Alternative I-a for the description of differences between the alternatives.

Section 1

From the end of the pavement east of the town of Boulder to the Deer Creek drainage (about 4 miles), medium/light construction would be indicated. On the Deer Creek approaches (both directions) medium construction is required, and a bridge is planned.

Medium construction would then continue for about 4 miles to The Gulch switchbacks, where heavy construction would be necessary. On the approach from the west, realignment would be accomplished to place the road above the high water line. A bridge is proposed over The Gulch creek crossing.

As the road ascends Long Canyon (for about 6 miles) some medium and some heavy construction would be undertaken. The latter includes considerable amounts of stream channel alteration and riprap protection for the road.

For about 2 miles medium-to-heavy construction would be employed on the downgrade from Long Canyon to Horse Canyon, then for about 13 miles, medium construction and light construction would alternate to the western boundary of Capitol Reef National Park. Included in this alternative would be replacement of the existing wooden bridge at Horse Canyon by a culvert in the same location.

Section 2

From the western boundary of Capitol Reef National Park to the Muley Twist Wash area, a distance of about 3 miles, medium-to-medium/light construction techniques would apply. In the Muley Twist Wash, medium/heavy construction would be called for, and would include a bridge.

A two-mile section of road then leads from the top of the Waterpocket Fold down to the junction with the Notom Road. Heavy construction would be necessary to provide minimum 50-foot radius curves on the switchbacks and 20- to 26-foot road with minimal ditch area. The ditches (along the inner "cliff" side) would be curbed to assist drainage. At the base of the cliffs to the junction, medium construction would be proposed, with a bridge crossing at Halls Creek and possibly some channel alterations of the creek.

The roadway then proceeds for about 5 miles to the eastern boundary of Capitol Reef National Park. From the junction to The Post, light construction would be employed. From The Post to the boundary, medium construction would be necessary for a realignment of over a mile of roadway. The road could be realigned up to 500 feet laterally.

Section 3

From the boundary of Capitol Reef National Park to the boundary of Glen Canyon National Recreation Area (about 19 miles) light to medium/light construction is proposed. Existing alignment would be followed; the major engineering problem encountered would be poor soil conditions for paving purposes. Replacement of some culverts would be necessary.

Section 4

As the Boulder-to-Bullfrog road enters Glen Canyon National Receation Area, a short section of roadway about 1 mile from the boundary would require heavy construction to alleviate excessive grade (over 10%) and upgrade a sharp curve. Light construction then would apply up to Bullfrog Creek, where a bridge is proposed.

About 1 mile beyond Bullfrog Creek a curve realignment would require medium construction for about 1,000 feet. Beyond that, to the junction with Highway 276, light construction would be appropriate.

The FHWA report does not identify the location of the batch plant for preparation of the hot mix. See the Appendix for typical roadway sections as visualized by FHWA engineers. The FHWA report included a preliminary investigation of potential sources of aggregate. One is near the town of Boulder, about 1 mile west of the road. Another is Sand Creek Pit, close to the Notum Road. Eggnog is also identified as a source under Alternative # I-a. Gravel terraces in the Bullfrog Creek drainage within Glen Canyon National Recreation Area are included. Materials available at the select borrow source in Horse Canyon are not considered by the FHWA to be suitable for pavement or base coarse aggregate.

Although the FHWA report did not discuss the locations of batch plants or construction camps, the needs of the contractor would presumably be considered, as discussed in Alternative I-a, and appropriate clearances obtained before construction.

Alternative II - Gravel entire route

This alternative would incorporate the construction (except paving) outlined in Alternative I-b (Pave Entire Route). There would be no changes in the numbers of bridges, culverts, etc.

Refer to Alternative I-a for a basic description of the roadway and to the Appendix for engineering definitions and design specifics.

Alternative III - Limited Improvement

The concept is for a low speed (20 to 35 miles per hour in most sections) unpaved scenic road to provide safe passage between Boulder and Bullfrog about 90 percent of the time. With one exception, it would not depart from the existing roadway. See Alternative I-a for a basic description of the roadway.

Section 1 - The roadway from the town of Boulder to the west boundary of Capitol Reef National Park

This approximately 30-mile stretch of road is crossed by several drainages. One, the Horse Canyon East crossing, is presently served by a wooden bridge that would be retained and reinforced. The other major crossings--Deer Creek, The Gulch, and Horse Canyon--would be provided with paved dips; if the substrate is unsuitable for paved dips, then appropriate culverts would be installed.

Earthwork will be confined to the existing roadway in this section. At the approaches to the paved dips, importation of materials will be necessary to provide an adequate grade. In some areas, especially between Long Canyon and the park, clay soils are present. These portions of the road are unstable, and would require import of granular material to improve the road subgrade; this would be topped with gravel.

Section 2 - The roadway within Capitol Reef National Park

This approximately 9-mile length of roadway winds through a portion of the Waterpocket Fold, and presents some of the more difficult challenges for road improvement. Some gravelling (as described in the Section 1 discussion) would be necessary for parts of the road between the western boundary and the Muley Twist Wash. No deviation from the existing roadway would be allowed.

The Muley Twist Wash roadway would also be followed, and would be unaltered, except for a paved dip at a point where the wash crosses the roadway.

The existing roadbed at the switchbacks would be adhered to, except for cutting and filling in the course of routine and emergency maintenance. Existing drainage and safety devices would be examined to determine if improvements could be made without altering the existing grade and alignment.

At the Halls Creek Crossing, either a paved dip or culvert would be installed. Some importation of materials may be necessary to improve the grade at the approaches.

Between The Post and the eastern park boundary is a ±6,000-foot length of roadway that would be relocated to the left no further than 500 feet from the existing roadway alignment. This would take the road out of a wash bottom and eliminate multiple wash crossings. The length of the roadway would be constructed to a 26-foot width standard, with a dirt

surface and adequate provision for drainage. This would be the only departure from the existing alignment incorporated in this alternative.

Section 3 - The roadway from the east boundary of Capitol Reef National Park to the west boundary of Glen Canyon National Recreation Area

There are some minor wash crossings on this 19-mile stretch of road. About 11 miles have been graded and drainage structures installed. In a few locations new or replacement culverts or paved dips may be required. One or two locations may require importation of granular materials for the subgrade and subsequent addition of gravel.

In this section the road would not be widened or any other departure made from the existing alignment.

Section 4 - The roadway within Glen Canyon National Recreation Area

For this alternative, there would be no construction in this section outside the present roadway. A 30-foot-wide bridge crossing at Bullfrog Creek would be required to provide for dependable access when Lake Powell is full. Earthworks at the approaches to the bridge would be required to provide proper alignment of the road.

About 2½ miles from the junction with Route 276 is a large culvert that provides drainage for a fill area crossed by the road. Some work would be required here to control existing problems of erosion.

Alternative IV - No action

Refer to Alternative I-a for a basic description of the roadway.

The Boulder-to-Bullfrog road is, as it exists today, a low-speed dirt-and-gravel thoroughfare that is passable by most two-wheel-drive vehicles during periods of good weather. Periods of wet weather, however, often cause washouts at stream crossings and create slippery conditions where the road traverses clay beds. When this occurs, only four-wheel-drive vehicles can be used over the road; flooding at certain areas (e.g., The Gulch and Bullfrog Creek) can be extensive enough to preclude all vehicular traffic.

Garfield County now maintains the Boulder-to-Bullfrog road. Should the No Action alternative be adopted, this level of county support would likely continue.

In contrast to the other Alternatives which would likely result in increased use, the No Action alternative would result in an increase or decrease depending on several outside variables, including:

1. Developments associated with the Southeastern Utah area. These can include: industry, mining, recreational developments, and improvements made on other roads.

2. Level of routine and emergency maintenance on the road.

3. Changes in visitor use patterns because of economic conditions or any other factors.

AFFECTED ENVIRONMENT

NATURAL ENVIRONMENT

Geology, Soil, and Water

The setting of the Boulder-to-Bullfrog road--deep canyons, low plateaus, domes, mesas, and the Waterpocket Fold--broken by faulting and carved by tributaries of the Colorado River--is undoubtedly one of the most spectacular in the country. The geology of the area has been relatively well studied, primarily because of the presence in the region of uranium and other mineral deposits of commercial interest.

Exposures of rock formations range from Permian (about 250 million years old) to Cretaceous (about 70 million years old), and there are younger (Quarternary) sedimentary deposits.

Rock Formations Crossed by the Boulder-to-Bullfrog Road

Quaternary	- Various alluvial deposits
Cretaceous	- Mancos Shale Dakota Sandstone
Jurassic	- Morrison Formation Summerville Formation Entrada Sandstone Carmel Formation
Triassic/Jurassic	- Navajo Sandstone
Triassic	- Kayenta Sandstone Wingate Sandstone Chinle Formation Moenkopi Formation
Permian	- Kaibab Limestone

Source: Geology of the Capitol Reef Area; and others.

Predominant soils consist of coarse-grained, wind- and water-developed material derived largely from sandstone. The soils are highly unstable and susceptible to wind and water erosion. Cryptogamic earth is found in some areas of the roadway, notably at Muley Twist. The surface forms a delicate crust composed of nitrogen-fixing bacteria and algae. If this crust is disturbed, erosion and depletion of soil nutrients will follow.

Many sections of the Boulder-to-Bullfrog road are built over clay soils with unstable characteristics. This is especially true of the area between Muely Twist Canyon and Long Canyon. In the drainages, the road crosses unconsolidated alluvium, with varying amounts of gravel incorporated. Sandy loams are sometimes found from the base of the Burr Trail switchbacks to the boundary of Glen Canyon National Recreation Area.

Two geological resources of special concern in road construction are gravel and water. Perhaps the best gravel deposits near the roadway are those located along Bullfrog Creek (identified as a source in both subalternatives of Alternative 1). According to a recent opinion of a Department of the Interior Solicitor, these deposits may only be used in NPS areas, and then only if the following criteria are met: 1. It is totally impractical to import gravel, 2. The gravel site is devoid of cultural resources, and 3. The area has a low natural resource value.

Water for compaction of materials and for dust control may be obtained at Boulder and at Bullfrog, and in various of the drainages crossed by the road (notably Deer Creek and The Gulch). Existing water rights on BLM lands, including those held by private interests, could affect the availability of water in the area. The Waterpocket Fold region lacks readily-available water. However, Capitol Reef National Park's General Management Plan provides for a well at the base of the fold for a proposed development; that aquifer could be tapped for the proposed road improvement.

No earthquakes of a magnitude greater than 4.3 on the Richter Scale were recorded in Garfield County between 1853 and 1978 (latest records available), and frequency is relatively low.

Climate

The area of Garfield County traversed by the Boulder-Bullfrog road is in the Desert Climatic Zone as defined in the Modified Koppin Classification (based on the response of vegetation to temperature and precipitation factors). This zone has been characterized as "areas where the average annual precipitation is less than one-half of the annual potential evapotranspiration. In these areas total annual precipitation is usually about five to eight inches" (Atlas of Utah).

Based on rain records from several stations in the region, August is the wettest month of the year and February is the driest. Winter snows average about 15 inches, with much variation from year-to-year. Sporadic heavy rains in the summertime often result in flashflooding and consequent washouts on the Boulder-Bullfrog road. (Source: park files)

Precipitation at Burr Trail Station, Capitol Reef National Park

	1982	1983	1984
January	not available	1.24	.70
February	not available	.80	.25
March	.50	2.32	.06
April	.32	.34	.76
May	.40	.45	.00
June	.30	.22	.59
July	.05	.58	1.32
August	2.55	.96	1.76
September	.45	.24	.40
October	.35	2.01	1.35
November	.96	.64	.05
December	1.96	1.14	1.99
Total	7.84"	10.94"	9.23"

Note: Not recorded daily.

Source: Park files.

High evapotranspiration rates contribute to the aridity of the region, and extreme temperatures (below 0°F and above 100°F) occur in the appropriate season. The annual mean temperature along the Boulder-Bullfrog road ranges between 50° and 55°F. January tends to be the coldest month, and July the hottest. (Source: park files)

Flora and Habitat Types

Plant species in riparian habitats are dependent on the water tables in drainages. Although there is some variation between the drainages along the Boulder-to-Bullfrog road, some species are more frequently encountered. These incude tamarisk, willow, and cottonwood.

Plant species encountered in desert habitats are unable to tap the water table, and high evapotranspiration rates preclude dense vegetation of any type. Along the Boulder-to-Bullfrog road, two primary types of desert communities are found--xeric shrub and pinyon/juniper.

Common plants of xeric shrub regions (primarily the flatter, lower areas along the road) include blackbrush, saltbrush, prickly-pear cactus, snakeweed, Mormon tea, greasewood, and sagebrush. Xeric shrub tends to grade into the pinyon/juniper community as higher elevations occur. This community is also found on north facing slopes and in the bottoms of washes. Other common species in the pinyon/juniper habitat type include sagebrush and rabbitbrush. (NPS and BLM files)

Fauna

The Boulder-to-Bullfrog road lies within the Kaiparowits subcenter of the Colorado Plateau Faunal Area. The subcenter ". . . is characterized by mammals found primarily in Arizona whose range extends into and often through this area." (Atlas of Utah)

Large mammals found in Garfield County include mule deer, bighorn sheep, bison, and elk. Prior to the mid-nineteenth century bison and bighorn sheep ranged widely in southern Utah. Restocking in the Henry Mountain area of both species has been successful, and they occur occasionally in the region east of the Waterpocket Fold. Mule deer may be found in many areas along the Boulder-to-Bullfrog road. Although there is elk winter range in BLM's Escalante Resource Area, elk are not known in the areas adjacent to the Boulder-to-Bullfrog road. The potential exists, however, for stray individuals from the Steep Creek area to wander to the roadway. A hunt is established now for bull elk in the area. Likewise, pronghorn antelope occur in Wayne County to the north, where they were introduced, but they apparently do not range as far south as Garfield County.

Carnivores include ring-tailed cats, badgers, fox, coyotes, bobcats, and mountain lions. A variety of small mammals occur at various locations along the Boulder-to-Bullfrog road, including rabbits, porcupines, woodrats, kangaroo rats, mice, beaver (e.g., in Hall's Creek), gophers, squirrels, skunks, and bats.

Some of the larger bird species that may be seen from the Boulder-to-Bullfrog road are red-tailed hawks, golden eagles, and Cooper's hawk. Peregrine falcons (one pair) nest in the Long Canyon area. Some other more commonly observed species include American kestrels, mourning doves, various swallows, scrub jays, ravens, rock wrens, and various warblers and sparrows.

Several species of lizard, a few snakes, and several frogs and toads complete the list of vertebrate fauna along the Boulder-to-Bullfrog road. Notable species include the spadefoot toad, Woodhouse's toad, the red-spotted toad, leopard frogs, collared lizards, spring lizards, and fence lizards.

In the various drainages crossed by the Boulder-to-Bullfrog road are several species of fish. The species most likely to be encountered are speckled dace, black bullheads, and bluegills. Also in these waters is the typical range of aquatic invertebrates such as snails and insect larva. The terrestrial invertebrate fauna has not been extensively studied, but includes examples of most of the major insect orders.

Endangered Species

The U.S. Fish and Wildlife Service (FWS) Endangered Species Office in Salt Lake City has identified several species of concern that may occur in the area of the Boulder-to-Bullfrog road. They are:

Listed
Peregrine falcon (Falco peregrinus)
Bald eagle (Haliaeetus leucocephalus)
Colorado squawfish (Ptychocheilus lucius)
Bonytail chub (Gila elegans)

Proposed
Jones cycladenia (Cycladenia humilis var. jonesii)

The BLM and the NPS have initiated separate studies to determine if the proposed road paving is likely to affect any listed species or crucial habitat. These studies will also determine if the proposed action is likely to jeopardize the continued existance of proposed species or result in the destruction or an adverse modification of any critical habitat proposed for such species. If the determination is "may effect" for any listed species, the agencies will request formal Section 7 consultation with the FWS. No irreversible or irretrievable commitment of resources related to the proposed paving will be accomplished until the Section 7 Endangered Species Act consultation process is complete.

Specific concerns the FWS has about the proposed project on which BLM and NPS will report include:

1) Essential habitat for wintering bald eagles could exist on or near the proposed road construction. Essential habitat is defined as those locations used annually by 15 or more eagles for two weeks or longer. If so, the project could have an effect on the population.

2) An active peregrine falcon eyrie is located in the Long Canyon area, and there could be other peregrine falcon sites near the project area. Effects of the proposed road construction and (potentially) increased traffic on this species require determination.

3) If water for road construction was taken from the Colorado River drainage, there could be an effect on the Colorado River fishes.

4) A population of the plant species Jones cycladenia, whch is proposed for inclusion as a threatened and endangered species, exists to the west of the project near Purple Hills. There could be populations of this species near the project area.

Some preliminary reports from the field are available. As of December 1984, there were no known sightings of threatened or endangered wildlife or plant species on BLM lands adjacent to that portion of the Boulder-to-Bullfrog road that lies between the Capitol Reef National Park and the junction with Highway 276. One exception are wintering golden eagles sometimes noted in the surrounding area, searching for prey.

Between Capitol Reef National Park and the town of Boulder is Long Canyon, where the peregrine falcon eyrie (noted in no. 2 above) is situated approximately 1/4 mile from the roadway. No other threatened or endangered animal species other than the two raptors mentioned appear to have the potential of being affected by the proposed Boulder-to-Bullfrog paving.

There are several rare plant species that occur in the general study area. Garfield County has been described as having ". . . the highest potential for rare and endangered plants in the state, next to Washington County" (Ecological Reconnaissance: Halls Creek). The previously mentioned Jones cycladenia has been found within 15 miles of the Boulder-to-Bullfrog road. BLM biologists have also identified the rare Wright fishhook cactus as having ". . . potential for encountering . . ." (BLM files) in the area. NPS files indicate that there is potential for finding the Harrison milkvetch (an endangered species) near the roadway.

Air Quality

A program mandated by the Clean Air Act is prevention of significant air quality deterioration. There is provision for three levels (Classes) of quality; each differs in the amount of deterioration permitted. The lands crossed by the Boulder-to-Bullfrog road are all Class II areas except for Capitol Reef National Park, which is Class I (the most restrictive class in terms of allowable levels of deterioration).

Data on the existing air quality of this region are very limited. However, the levels of particulate matter appear to be sufficiently low that the maximum allowable concentrations of this and other pollutants do not threaten to exceed Class I and Class II threshholds. The primary existing threats to air quality are vehicle emissions and fugitive dust.

CULTURAL RESOURCES

The earliest documented occupants in the region were of the Colorado Plateau, or Desert Archaic Culture (about 8,500 to 2,500 years ago). They depended primarily on hunting and collecting plants for food. Then, about 1,500 years ago, corn was introduced, and the bow-and-arrow, pottery, and other indicators of a more advanced culture became evident in the area.

The two cultural groups in southrn Utah representative of this new stage were the Fremont and the Anasazi. The Fremont left most of the cultural evidence of pre-European settlement in the region between Boulder and the Bullfrog Basin. The Fremont Culture centered around agriculture and gathering of wild plants, and there still exist structures (particularly grainaries), stone tools, and rock art made by Fremont Indians.

The Anasazi are not traditionally associated with the Boulder-to-Bullfrog area. The culture reached its peak about 700 to 800 years ago with the well-described cliff dwellings, none of which were known in the project area east of Boulder until very recently; a 60-room ruin was discovered a few years ago in the Circle Cliffs area.

Most recently, Paiute Indians, a Shoshonean group, lived in the region. There culture was centered around hunting game and gathering plant foods, and it was the Paiutes who met the first Mormon settlers in Garfield County. This varied and somewhat complex series of prehistoric occupations of the Waterpocket Fold area presents problems for those seeking to understand existing sites. As one archeologist says (Revitte 1985), "In this region of three cultures, it is sometimes difficult to define which sites belong to which culture." Many of the recorded sites cannot be assigned to one specific group.

Certain portions of the Burr Trail itself, particularly on the west side of the Waterpocket Fold, constitute a route utilized during prehistoric times as well as by the earliest European explorers, settlers, and miners. The switchbacks down the east face of the Waterpocket Fold, and the road to the east, were built in fairly recent times.

A preliminary examination of the Boulder-to-Bullfrog road was made by BLM archeologists for this Environmental Assessment. For the Henry Mountain Resource Area (BLM), Glen Canyon National Recreation Area (NPS), and Capitol Reef National Park (NPS), the examination consisted of verifying recorded site locations on or near the roadway. As little information exists for the roadway through the Escalante Resource Area, a BLM team began an examination of that section in December, 1984. Snowfall precluded completion of the survey, but several sites were recorded within or near the roadway of the proposed realignment at The Gulch and elsewhere along the roadway.

Sites represented along the Boulder-to-Bullfrog road include habitation sites (rock shelters), campsites, aboriginal stone tool quarries, lithic scatters, and rock art. The campsites (temporary and long-term) may be found anywhere, but are expecially common in sandy areas and in

pinyon-juniper stands. Quarry sites are found wherever chart and chalcedony nodules occur. Chipping sites are prevalent throughout the region.

LAND USE

The existing use of the Boulder-to-Bullfrog road is primarily of two types: recreational and administrative. The road (or parts of it) are used by persons who wish access to backcountry areas in the Circle Cliffs and Waterpocket Fold regions, as a convenient means of viewing the countryside, and as a means of getting to and from the Notom road and more westerly locations in Garfield County such as Escalante and Boulder. These may be considered recreational uses.

Federal, state, and Garfield County officials use the road for various management needs. These may relate directly to land use management (e.g., BLM's grazing permit monitoring activities and NPS's recreational use monitoring), or indirectly as the most convenient means of transportation between two points (e.g., Garfield County's responsibilities in the Bullfrog-Ticaboo area).

Federal Land Use Management

The BLM is governed by a legislative requirement that the public lands be managed for multiple uses; lands and resources generally are not managed for a single use but for several complementary uses. The relative importance of each use activity depends primarily upon the capabilities of the land and on public demand. The BLM concept of multiple use provides for both the use and the protection of public land resources. In the Escalante Resource Area and the Henry Mountains Resource Area, existing uses include livestock grazing, recreation, hunting, wildlife habitat, mineral activities, and management of wilderness study areas.

The NPS is governed by legislative mandates that require conservation of natural resources for the use and enjoyment of the public, and this basic management goal applies to all units of the National Park System. The enabling legislation for Glen Canyon National Recreation Area also provides for grazing and for mineral leasing insofar as these uses are compatible with basic conservation and public recreation purposes. Likewise, legislation for Capitol Reef National Park provides for retention of existing grazing rights within the park, with an administratively-determined phase-out schedule.

State Land Use Management

The State Land Board manages state school sections within BLM and NPS boundaries. The state grants grazing and mineral leases, and other commercial activities on these sections.

Local

Garfield County officials manage county interests (it owns no land along the Boulder-to-Bullfrog road) based on perception of likely benefits to

the residents of the county. The 1984 updated Garfield County Master Plan, prepared by the Five County Association of Governments, is the basic reference for planners and others interested in economic growth and other benefits to residents.

RECREATION AND WILDERNESS VALUES

The National Park Service and the Bureau of Land Management have quite similar approaches to public uses of areas along the Boulder-to-Bullfrog road. The road furnishes backcountry users with a means of access to the spectacular canyon country of the Waterpocket Fold, and the Circle Cliffs area. There are fine views along the road for those visitors who do not wish to venture into the surrounding countryside. Impacts of paving the road on recreational use patterns will be considered.

The extensive development at Bullfrog attracts persons (241,000 in 1984) interested in the more active watersports-oriented environment that Lake Powell provides. Paving the Boulder-to-Bullfrog road may affect the amount of use of the facilities and services provided at Bullfrog.

Agency concerns about wilderness are largely governed by legislative and policy constraints, but both the BLM and the NPS operate under agency management guidelines.

The descriptions that follow of the two study areas managed by BLM are extracted from "Introducing the Utah State Wilderness" EIS prepared by BLM.

North Escalante Canyon/The Gulch ISA

The ISA is located in Garfield County, approximately 5 miles east of the Town of Escalante, Utah. The ISA contains 119,273 acres of BLM-administered land which includes the North Escalante Canyons Outstanding Natural Area (5,800 acres), Escalante Canyon Outstanding Natural Area (840 acres), The Gulch Outstanding Natural Area (3,430 acres), and portions of Deer Creek Recreation Area (475 acres), Calf Creek Recreation Area (425 acres), and Phipps-Death Hollow Outstanding Natural Area (12 acres).

The majority of the ISA characterized by steep-walled canyons, mesas, plateaus, and natural arches. The Escalante River and Harris Wash flow through the ISA. Much of the ISA is bare rock outcrop; pinyon-juniper is the major vegetation type.

Steep Creek WSA

The WSA is located approximately 3 miles east of Boulder, Utah, and borders the Dixie National Forest on the north and the Burr Trail on the south. The WSA is characterized by a series of long, deep canyons separated by benches. The major vegetation type is pinyon-juniper. There are approximately 5,000 acres of elk winter range in the WSA.

Opportunities for both solitude and recreation are excellent throughout most of the WSA. The opportunities for solitude are related to the numerous winding canyon drainages with their riparian

vegetation and the steep cliffs, which isolate benchlands between drainages. There are outstanding opportunities for backpacking, hiking, horseback riding, photography, sightseeing, and rockhounding. The quality of naturalness is high, and there are few minor intrusions. Approximately 3,800 acres do not meet wilderness criteria.

The geological features, which provide scenic values, are a special feature of the WSA.

Possible resource conflicts include uranium exploration and/or development (northeast portion of WSA) and rights-of-way (southern portion of the WSA.)

The proposed wilderness for Capitol Reef National Park includes 11 geographical units, of which units 2 and 3 have boundaries near the Burr Trail (Boulder-to-Bullfrog road). The descriptions of these units that follow is extracted from "Revised Wilderness Recommendation: Capitol Reef National Park - a 1983 report by the NPS.

> Wilderness unit 2 (Wagon Box Mesa) encompasses 29,280 acres and includes a portion of Halls Creek, plus Red Slide, Muley Tanks, Brimhall's Double Arch, much of Muley Twist Canyon, Wagon Box Mesa, and Grand Gulch. This unit is about 12 miles long, with a width varying from 2½ to 6½ miles. It is bounded on the north by Burr Trail and another graded road that parallels Halls Creek by the Post; on the east, and most of the west by the park boundary; and on the south by a State section and the park boundary. Potential wilderness additions of 950 acres consist of an oil and gas lease area, the Rainy Day Mines and access road, and a livestock corral and road access near the Post.
>
> This unit is the most outstanding of all for wilderness designation, and also the one most fragile and susceptible to damage by outside influences because of its narrowness.
>
> Wilderness unit 3 (Red Canyon) includes 27,260 acres; it is bordered by the Burr Trail on the south, a road along most of the eastern and northern sides, and the park boundary on the west. It is almost 18 miles from north to south, and varies from 1.7 to 4 miles in width. Potential wilderness additions of 85 acres consist of a primitive road in Muley Twist Canyon and a stock tank on Cedar Mesa.

SOCIOECONOMIC ENVIRONMENT

Because of the complexity of the socioeconomic issues relating to this project, the Utah Office of State Planning and Budget was contracted to accomplish a socioeconomic study of the proposal to pave the Boulder-to-Bullfrog road. The study document is available for examination from the National Park Service. Following is a summary of information from the study.

At this time, traffic over the Boulder-to-Bullfrog road averages 10 vehicles per day. Should the road not be paved, negligible increases in use are projected (perhaps one vehicle per day per year increase, based on overall Utah State projections of 6 percent annual increases on all roads). Without paving, projected income and population figures are based on existing levels of roadway maintenance.

Total monthly personal income is projected to be $2.65 million in Garfield County in 1988, increasing to $3.47 million in the year 2000. For Kane County the figures are $2.37 million and $3.54 million for the years 1988 and 2000 respectively.

In Garfield County, the population of the community of Escalante is projected to be 723 in 1988, increasing to 753 by 2000. In the town of Boulder, 1988 and 2000 population projections are 122 and 127 respectively. In Kane County, the unincorporated area of Bullfrog is projected to have an increase of 19 between 1988 and 2000, increasing from 96 to 115 persons. However, it should be realized that residents of Bullfrog are employees of the National Park Service and the area's concessioner. The National Park Service controls the number of its employees in the area as well as the availability of housing for all residents.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE I - PAVE ENTIRE ROUTE

This alternative is divided into two subalternatives (see description of alternatives). Environmental impacts of the subalternatives are essentially the same, and so will be analysed as one. Certain specific exceptions are, however, mentioned in the discussion that follows.

Natural Environment

Geology, Soil, and Water Environmental Impacts.

Widening and paving of the Boulder-to-Bullfrog road and other construction activity (e.g. realignments, placement of fill, extraction of materials from borrow areas, and use of water resources) would disturb fragile soils. Erosions of soils in these disturbed areas would occur. Backcountry soil erosion caused by increased ORV use could result because of the improved access afforded by an improved roadway. Widening and realignment in the Muley Twist Wash would destroy some areas of cryptogamic earth. Sedimentation would occur in the drainages crossed by the road. Use of materials from borrow areas could lead to unnatural patterns of drainages in the impacted areas, and could increase the amount of sediment discharge into adjacent streams.

Mitigation Measures

Methods such as reseeding, proper grading, and installation of appropriate surface water runoff devices would reduce soil erosion problems caused by construction along the roadways. Special care could be given to avoid areas where cryptogamic earth is found. Water could be drawn from drainages during periods when stream flow is in excess of that amount needed to maintain natural water table levels. Sorting of materials in borrow areas could be done so that wasted fines are prevented from entering streams. During construction, the road could be watered to reduce the quantities of dust.

Flora and Habitat Types: Environmental Impacts.

Removal of approximately 600 acres of roadside vegetation would occur during road construction (widening, cutting and filling, realignments). Extraction of water from the drainages for compaction of materials and for dust control could have adverse effects on riparian vegetation.

Migitation Measures.

Consideration could be given when altering the roadway alignment to avoid specimen trees, areas with cryptogamic earth, and other areas of concern. Revegetation of fill areas with appropriate native species (or exotics, on BLM lands) could be undertaken.

Fauna:
Environmental Impacts.

Removal of soil and flora as discussed above would cause localized disturbance and possible displacement of certain small vertebrate species, and invertebrates. Road kills would increase. The potential exists for disturbing bird nesting due to possible increased traffic noise. Stream fauna could be adversely affected by increased sediment load.

Mitigation Measures.

Appropriate signing could reduce road kills by making the travelling public more aware of animal life near the road.

Endangered Species:
Environmental Impacts.

Potential impacts of this alternative on Threatened or Endangered (T&E) species fall into two categories - elimination of individual organisms and populations, and causing the displacement of individuals and populations. As there is no designated critical habitat for any T&E species along the roadway, it is unlikely that there would be any displacement or destruction of any sizable populations.

Responses from field areas to the four concerns expressed by the U.S. Fish and Wildlife Service on T&E species (under "Affected Environment") are incorporated here intact (BLM and NPS files).

Responses from the Cedar City District Office, BLM:

1. The only essential habitat for wintering bald eagles near the project area occurs on Lake Powell within the Glen Canyon National Recreation Area. It is unlikely that this project would have any effect on those birds.

2. The Long Canyon eyrie is the only known peregrine nest site along this road. Effects of road construction and increased traffic on this nest site are unknown, but are likely to be similar to those analyzed for the Circle Cliffs Tar Sands EIS.

3. It is unknown how much water would be required for construction and what the source would be.

4. The Purple Hills and Deer Point are the only known populations of Jones cylandenia in the project area and will not be affected by this project.

Responses from Glen Canyon National Recreation Area, National Park Service:

1. Based on recent wintering bald eagle habitat census it has been determined that the Halls Creek area supports a small wintering population. The road upgrade project, will not, in our opinion, affect this population.

2. Peregrine falcon sightings are common in the Bullfrog Basin. It is anticipated, based on the frequency of sightings, that an eyrie occurs in the Bullfrog vicinity. The location of this eyrie has yet to be identified; however, typical habitat is lacking along the lower portions of the road corridor. Based on the lack of potential habitat and the fact that the road presently exists, the project is not anticipated even at a higher level of use, to have any effect on the peregrine falcon.

   A peregrine falcon eyrie is located in Long Canyon within 1/4 mile of the road. It is possible that construction involved with the upgrading of this road and increased traffic after upgrading could adversely affect this eyrie during a portion of the year.

   The crucial period of the year for peregrine falcons is the nesting season (mid-March through June), with the egg-laying and incubation period (mid-March through June) being the most critical time. Nest disturbances during the egg laying/incubation period may cause the adults to abandon their nest.

   The most significant impact to pergrines would be from increased noise from vehicles and machinery in Long Canyon. Whether or not the increased noise levels would disturb this pair of falcons depends largely on the disposition of the birds, particularly the female. Some peregrines nest successfully on city buildings and seem not to be affected by traffic or other city noises. Other peregrines abandon their nests at the slightest disturbance. It is unknown how the Long Canyon pair will react. However, the probability of disturance is likely to increase as traffic increases.

   The most critical time for disturbance would be from mid-March during the egg-laying and incubation period. The change of nest abandonment would decline after the young have hatched and would continue to decline until the young have fledged. Traffic should have little effect on peregrines after the nesting period.

3. The water use requirements for road construction are not available to park staff at this time; however, from the endangered species perspective water use will have no effect on the Colorado River squawfish and the bonytail chub. Both species require river habitat which is lacking in the project area.

4. Due to the distance from the road, the overall impact of this proposal on Jones cycladenia should not result in the escalation of these activities to the extent that the species would be further jeopardized.

Mitigation Measures.

Until such time as the Section 7 consultation process is completed, no construction work or other potentially adverse actions will be implemented on the Boulder-to-Bullfrog road. If no adverse effects are identified and the proposed road paving proceeds, agencies would carefully monitor the work to ensure continued compliance with the Endangered Species Act.

Construction in Long Canyon would be restricted during the peregrine nesting and egg incubation period.

Air Quality:
Environmental Impacts.

With Alternative I, paving the road would eliminate the dusty conditions now experienced by drivers. Should the Boulder-to-Bullfrog road be paved, the most significant impact on air quality would likely be an increase in vehicle emissions. At the projected level of 250 vehicles per day, it would not constitute a threat to the air quality of any of the areas along the roadway, including Capitol Reef National Park, a Class I area under the Clean Air Act.

Fugitive dust would create short-term impacts on air quality during the construction phase.

Mitigation Measures.

During construction, the roadway would be treated with water to assist in compaction and to reduce the amount of fugitive dust produced.

Cultural Resources

Environmental Impacts

Impacts of paving the Boulder-to-Bullfrog road to cultural resources relate primarily to the approximately 30 archeological sites near or adjacent to the roadway, the proposed realignments, and to the proposed borrow areas. Impacts can be direct (damage caused by road construction activities) or indirect (damage caused by an increase in human activities near the roadway). It is likely that the proposed realignments would directly impact about 10 sites.

Mitigation Measures

Before realignment or other alterations of the existing roadway can take place, the roadway and quarry sites must be evaluated for their National Register and interpretive significance. Alternative I-b differs from Alternative I-a in that the former proposes a minor realignment near the Halls Creek Crossing in Capitol Reef National Park to avoid an Archaic pictograph.

The preliminary examination of the proposed gravel pit along Bullfrog Creek (Glen Canyon National Recreation Area) did not yield any cultural resources. Should a full-scale archeological survey be completed and some level of construction be anticipated, standard stipulations would be applied to the contracts. A sample of stipulations used by the NPS and the BLM includes:

A. All vehicular traffic and personnel will be confined to existing roads and surveyed areas.

B. Personnel will refrain from collecting artifacts and otherwise disturbing cultural resources in the vicinity.

C. Should subsurface cultural resources be discovered during construction, construction will cease and the District Manager (BLM) or the Park Superintendent (NPS) notified immediately. The cultural resources will expeditiously be evaluated and mitigation measures, commensurate with the site's value and impact, instituted.

D. Should it be necessary to deviate from the defined right-of-way, a cultural resource investigation will be conducted prior to disturbance.

Land Use

Environmental Impacts

The proposal to pave the Boulder-to-Bullfrog road relates primarily to a hoped-for increase in tourism in Garfield County and surrounding areas. Should the road be paved, there is potential for demand for other activities relating to land use. These include mineral extraction and hauling (e.g., tar sand resources), pressures to improve backcountry roads feeding the Boulder-to-Bullfrog road, use of the roadway as a utility corridor (e.g., electrical power lines), and questions relating to the commercial leasing of state school sections on or near the road.

Mitigation Measures

Should the road be paved, agencies involved with use of the road (BLM, NPS, state of Utah, Garfield County) could develop management policies relating to land use along the roadway. The Federal agencies would be guided by the laws and regulations under which they now operate. Major road alterations involving substantial new construction and/or extensive realignment would not be allowed without formal prior approval on a case-by-case basis.

This assessment assumes that Garfield County or the state of Utah would maintain the road once it is constructed. Agreements would be drawn up between the county and the Federal land-managing agencies involved to assure that the maintenance properly protects Federal lands. The agreements would specify that th maintenance would include the pavement, shoulders, ditches, and adjacent disturbed slopes.

Recreation and Wilderness Values

Environmental Impacts

The relationship of proposed wilderness areas near the Boulder-to-Bullfrog road to eventual paving of the road has been discussed.

Projected traffic over the Boulder-to-Bullfrog road (the Creamer and Noble Report estimates 250 vehicles/day) should it be paved could lead both BLM and NPS to construct additional recreation support facilities (e.g., campgrounds, picnic facilities, and restrooms) adjacent to the road but not in the proposed wilderness areas. This would be especially true at Deer Creek, The Gulch, Calf Creek, and the area east of the Burr Trail switchbacks. There would be visual impacts due to these facilities, as well as the paving of the road, road realignment, bridge abutments, traffic safety barriers, and similar facilities.

If Congress designates wilderness areas on lands administered by BLM, that agency would prepare Wilderness Management Plans to govern use and protection of the areas. As part of the plans, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or "cherry-stemmed" into the wilderness areas for purposes of road maintenance, temporary vehicle pull-offs, and trailhead parking. These borders would be up to 100 feet from the edge of the road travel surface. As an equivalent border now exists through the recommended wilderness in Capitol Reef National Park, no legislative or policy changes would be required for that area should the road be paved.

Mitigation Measures

Agencies would respond to the recreational need of possible increased visitor traffic, and the BLM is bound by law and agency policy relating to the two study areas in the Escalante Resource Area. Facilities would be designed so as to blend into the landscape to the greatest degree possible. Color would be added to concrete to provide a more natural appearance (e.g., on the switchback barriers and bridges).

Upgrading the existing road (including minor realignments) where it passes through Long Canyon would be physically constrained by the severe topography and sheer canyon walls to such an extent that wilderness values of the North Escalante Canyon/The Gulch ISA and the Steep Creek WSA would not be affected.

Socioeconomic

Environmental Impacts

The following is extracted from the contracted socioeconomic study referred to under "Affected Environment." The analysis assumes that paving the Boulder-to-Bullfrog road would result in construction of a visitor service and complex east of the switchbacks in Capitol Reef National Park as proposed in the park's General Management Plan.

Several other assumptions were used in this analysis. The analysis assumes that the manpower requirements of construction of the road as stated in the Cramer and Noble report are accurate estimates. The analysis further assumes that Creamer and Noble's projected increase in traffic on the Boulder-to-Bullfrog road as a result of improvement is an accurate reflection of its use by new travelers. These traffic projections were used in the calculation of increased service needs in Capitol Reef National Park, and increased services and recreation direct employment due to the additional tourist travel on the improved road. Since Garfield and Kane Counties constitute the areas primarily affected by the economic changes the data presented in this section will include only these two counties and cities and towns within their borders.

Construction of the road, and new facilities at Capitol Reef National Park associated with the road, would result in a population impact of 244 in the peak year of construction (1988) in Garfield County, and then decline when construction is completed. The population impact of 24 by the year 2000 reflects the need to accommodate projected increase in tourist traffic associated with the improved Boulder-to-Bullfrog road.

The construction impacts would be insignificant in Kane County, with a projected population impact of 4 in 1988. After construction, however, Kane County would have the majority of population impact, in order to service the tourist traffic and related industries. The population impact is projected to be 115 by the year 2000, or an increase to Kane County's baseline population of 2 percent.

The number of households are projected to increase in Garfield County by 62 at the peak of construction in 1988. The total household increase in Garfield County above baseline by the year 2000 is projected to be 7. The households impact in Kane County is similar to its population impacts, with 1 new household projected for 1988 and an additional 32 by the year 2000.

Of the two major age groups of interest, increases of those over 65 would have no significant impact in either Garfield or Kane County. The school-age population, however, would be impacted. The school-age population is projected to increase by 49 in Garfield County during the peak year of construction. After the construction projects are completed the school-age population impact would be insignificant in Garfield County. Kane County is projected to have an increasing impact in the school-age group, with only 1 in 1988, and an increase of 34 children by the year 2000.

SUMMARY OF EXISTING AND PROJECTED POPULATION AND EMPLOYMENT LEVELS*

County	Population	Households	School Age Population	65 Years and Over Population	Total Employment
Garfield					
1985	4050	1360	940	470	1680
1988	4080	1350	980	450	1680
1990	4100	1370	1070	450	1680
1995	4200	1410	1140	430	1720
2000	4250	1420	1190	390	1770
Kane					
1985	4400	1340	1270	440	1440
1988	4600	1400	1330	450	1480
1990	4700	1430	1350	470	1510
1995	5200	1540	1540	480	1640
2000	5500	1700	1690	460	1780

*Based on continuation of present levels of repair and maintenance on the Boulder-to-Bullfrog road.

SUMMARY OF PROJECTED INCREASES IN POPULATION AND EMPLOYMENT LEVELS**

County	Population	Households	School Age Population	65 Years and Over Population	Total Employment
Garfield					
1988	244	87	49	1	137
1990	13	5	3	1	5
1995	17	6	4	1	6
2000	24	7	5	1	9
Kane					
1988	4	1	1	0	1
1990	55	16	13	3	23
1995	86	25	21	4	35
2000	115	32	34	4	46

**Based on implementation of the proposal to pave the Boulder-to-Bullfrog road.

Source: Utah Office of State Planning and Budget.

The highest monthly wage earnings in 1988 would be in the construction industry with a total monthly income of $329,000. This would account for 82 percent of total increase in personal income that year. The next highest category is property income, with a projected total monthly amount of $37,000. The total annual personal income impact in the peak construction year is projected to be $4,796,000. Almost all of this increase would be generated in Garfield County, as additional employment in this county is expected to be 137, with only one additional job in Kane County.

The composition of personal income would be expected to change after construction, with the majority of increased income being generated in the trade and services sectors of the economy. Personal income in the trade sector is projected to increase to a monthly level of $35,000 in the year 2000, while the services sector would increase to almost $15,000 per month. The trade and service industries would make up almost 54 percent of additional monthly personal income by the year 2000. The other major increase in personal income would come from payments to property owners. While this source would decline from after a peak construction year high of $37,000 per month in 1988, it would increase again, to over $25,000 per month by 2000. Most of the post-construction impacts in personal income would occur in Kane County. The impact on total annual personal income in the area by the year 2000 is projected to be $1,113,000.

The impact of the project in Garfield County would be largely in the community of Escalante, with the population increasing by 220 in 1988. Escalante accounts for 90 percent of the projected population increase for the entire county. The town of Boulder is projected to have an increase of 24 in 1988. In the year 2000, the impact population in Escalante would be 21 and in Boulder, 3. Almost the entire population impact in Kane County would be in the community of Bullfrog. The population impact is projected to be 4 in 1988 and increase to 115 by the year 2000.

The Boulder-to-Bullfrog road improvement project would create 120 new construction jobs and have a population impact of 248 in the peak construction year. Most of this activity would be located in Garfield County, especially in the town of Escalante. After construction is completed, the two counties are projected to experience modest growth associated with the additional tourist traffic. By the year 2000, there is projected to be a total population impact of 139 in the two counties. The majority of this impact would be generated by the trade and service industries, which would be primarily located in Kane County in the community of Bullfrog.

It should again be noted that the total impact in Garfield County would be larger than that shown here derived from additional traffic on the new road. However, that additional impact would be a redistribution of current jobs from Wayne County. In other words, some tourists now traveling to Lake Powell spend money en route to Wayne County. If they change their route, spending patterns would change accordingly. However, there would be no net change in spending in the regional economy.

Mitigation Measures

None.

Adverse Effects Which Cannot Be Avoided Should Alternative I Be Implemented

Some loss of natural topsoils, including cryptogamic earth, would occur if this alternative is implemented. Also, some increase in sedimentation during the construction phase would occur. The amount of erosion and sedimentation at The Gulch would be greater with Alternative I-b, which proposes more extensive work there. This would also be true at the Halls Creek crossing, where Alternative I-a proposes no realignment and Alternative I-b proposes a minor realignment, the amount of erosion and sedimentation would be greater in Alternative I-b.

Loss of about 600 acres of roadside habitat would be an unavoidable short-term effect. Also, permanent loss of about 100 acres of roadside vegetation would be inevitable.

Should the road be paved, experience has demonstrated that there would be increased human activitiy at archeological sites, and some artifacts would undoubtedly be damaged or removed.

Management decisions could be structured to avoid all of the impacts that were mentioned above (e.g., administrative exclusion of some commercial activities).

The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The net long-term effects of paving on the natural resources along the Boulder-to-Bullfrog road are minimal. For example, long-term effects on roadside vegetation would likely relate to projected maintenance needs and roadside visitor service activities rather than to the road construction activity. Under the paving alternative, the likihood becomes greater for constructing visitor use facilities.

There are, however, unknown cumulative effects of projected increased use of the road, including potential effects of improved access for ORV users.

For cultural resources, short-term effects and long-term concerns are quite similar. Increased understanding of the cultural resources present, which could result from studies associated with this project, could lead to increased protection and increased research potential for remaining intact sites along the Boulder-to-Bullfrog road.

In terms of land use, the proposal is for a scenic road (short-term and long-term). Should the road be paved, the potential exists for future changes in agency land management direction which could allow for uses of the roadway in ways other than strictly as a scenic road for tourists.

Irreversible or Irretrievable Commitments of Resources

None are evident for natural resources. Revegetation (natural or man-induced) could be accomplished in disturbed areas, and displaced animal populations would likely become reestablished in suitable habitat.

If appropriate guidelines are followed, impacts to cultural values, particularly in direct impacts, should be minimal. However, testing and mitigation work would result in the loss of in-context archeological data and the irreversible and irretrievable alteration of the resources.

ALTERNATIVE II - GRAVEL ENTIRE ROUTE

The environmental consequences of this alternative are identical to those given for Alternative I - Pave entire route, with few exceptions. Exceptions only are considered below.

Environmental Impacts

Traffic (perhaps 50 vehicles/day) on the roadway would create dust during dry weather. As less borrow material is required, there would be less impact on quarry sites and consequently less truck hauling. Placing gravel on the road would not prevent fugitive dust from becoming an occasional aesthetic and comfort problem. Perhaps 50 percent of the short-term socioeconomic impact, and 20 percent of the long-term socioeconomic impact as identified under Alternative I would apply to this alternative.

Mitigation Measures

Same as Alternative I, except that fewer facilities and reduced amounts of vehicle emissions would likely result because of fewer vehicles using the road.

Adverse Impacts Which Cannot Be Avoided Should Alternative II Be Implemented

None other than that given for Alternative I.

The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The alternative to gravel the entire route infers an incremental approach to improving the Boulder-to-Bullfrog road. This could include deployment of construction equipment on the road over a period of years as funds become available; consequent cumulative impacts of noise, dust, etc. caused by the use of machinery could cause aesthetic problems and could be disruptive to traffic and to wildlife populations.

Irreversible or Irretrievable Commitments of Resources

None other than that given for Alternative I.

ALTERNATIVE III - LIMITED IMPROVEMENT

Natural Environment

Geology, Soils, and Water
Environmental Impacts

The realignment included in this alternative (between The Post and the eastern boundary of Capitol Reef National Park) is the primary impact on geological resources. Cutting and filling in the new roadway section would disrupt the soils in the area, and alter the landscape somewhat. Use of materials from borrow areas to improve the grades and to provide gravel in some road areas could lead to increased rates of sediment discharge into adjacent streams. Fugitive dust would be a dry-weather impact in certain areas.

Mitigation Measures

Methods such as reseeding, grading slopes, and installation of appropriate culverts and other surface water runoff devices would reduce soil erosion problems caused by the construction mentioned above. Sorting of materials in borrow areas could be done so that as little sediment as possible is discharged into streams.

Flora and Habitat Types:
Environmental Impacts

Removal of approximately 100 acres of vegetation along the roadway between The Post and the eastern boundary of Capitol Reef National Park would occur during construction of the new alignment.

Mitigation Measures

The abandoned roadway could be revegetated with plant species native to that area of the park.

Fauna:
Environmental Impacts

Localized disturbance and possible removal of patches of habitat could occur for some small vertebrate and invertebrate species at the realignment and at the proposed Bullfrog Creek bridge site.

Mitigation Measures

None necessary.

Endangered Species:
Environmental Impacts

None other than that given for Alternative I.

Mitigation Measures

None other than that given for Alternative I.

Air Quality:
Environmental Impacts

Construction work on the roadway west of Capitol Reef National Park and at the realignment north of The Post would create the potential for excess dust. Fugitive dust would continue at approximately the levels now experienced on the Boulder-to-Bullfrog road.

Mitigation Measures

Watering of the roadway as construction progresses would eliminate most of the dust during the construction phase.

Cultural Resources

Environmental Impacts

As this alternative essentially follows the existing alignment, except for about 6,000 feet between The Post and the eastern boundary of Capitol Reef National Park, no extensive archeological survey would be required for implementation, except for:

1. The area of the proposed realignment.

2. The bridge site at Bullfrog Creek.

3. Any borrow areas from which road construction materials may be extracted.

There would be no impacts of this alternative on known archeological sites along the Boulder-to-Bullfrog road.

Mitigation Measures

Before the construction for the realignment could begin, a thorough archeological survey would be required at the site. See Mitigation Measures for Alternative I; they would apply here.

Land Use

Environmental Impacts

Improving the Boulder-to-Bullfrog road to allow 2-wheel-drive vehicular use about 90 percent of the year could lead to an increase of about 20 vehicles/day over the 10 per day now typical. Whether this use would be sufficient to encourage changes in land use patterns along the road (e.g., additional visitor use facilities in Capitol Reef National Park) is unknown.

Mitigation Measures

None identified.

Recreation and Wilderness Values

Environmental Impacts

Improving the Boulder-to-Bullfrog road within the scope of this alternative would probably have little impact on wilderness proposals for the region. Recreational traffic could increase enough to encourage agencies and private concerns to construct support facilities such as picnic areas and restrooms near the wilderness study areas.

Mitigation Measures

None apparently required.

Socioeconomic

Environmental Impacts

Perhaps 15 percent of the short-term socioeconomic impact and none of the long-term socioeconomic impact identified under Alternative I would apply in Alternative III.

Mitigation Measures

None.

Adverse Effects Which Cannot Be Avoided Should Alternative III Be Implemented

There would be loss of topsoil and some vegetation due to the single realignment. Loss of a certain amount of habitat is an unavoidable short-term impact for burrowing organisms along the realignment and for stream fauna wherever paved dips and culverts would be installed. Fugitive dust would continue to be an occasional problem during dry weather.

The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

All known environmental impacts relating to geology and other natural resources (soil, water, biota) are short term (lasting no more than about 5 years) in this alternative, except for fugitive dust. Short-term uses of the roadway as described in this alternative have no obvious long-term implications for recreational use, including backcountry use, or for cultural resources.

Irreversible or Irretrievable Commitments of Resources

None evident under this alternative.

ALTERNATIVE IV - NO ACTION

Environmental Impacts

Continued levels of road maintenance would have no obvious effects on soils and other geological resources of the area. Rock slides (especially on the switchbacks) and flooding (especially at Bullfrog Creek and The Gulch) would continue to occur. Incremental paving by Garfield County east of the town of Boulder would have little impact on any known resources, at least in the foreseeable future. Cumulative effects of maintenance vehicles using the road could affect some animal populations. Fugitive dust would continue to be an occasional impact.

Mitigation Measures

Present practices relating to maintenance, natural and cultural resource protection, and visitor services along the Boulder-to-Bullfrog road would be continued as funding levels and the demands of resource protection and visitor needs dictate. Archeological surveys and biological investigations (especially on T&E species) in the vicinity of the roadway would be encouraged.

Adverse Effects Which Cannot Be Avoided Should Alternative IV Be Implemented

Continued rock sliding and flooding would follow heavy storms.

The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

Continued problems relating to the uncertainty of using the Boulder-to-Bullfrog road (e.g., rock slides, flooding, and impassible clay beds) would lead to continued efforts to improve the road, with whatever environmental consequences the improvements would achieve.

Irreversible or Irretrievable Commitments of Resources

None.

CONSULTATION AND COORDINATION

An informal scoping period was provided to identify issues and alternatives to be discussed in the Environmental Assessment. One or more individuals from the following agencies, organizations, and companies participated in the scoping and/or assembly of information for this document.

Utah Congressional Delegation

National Park Service
- Rocky Mountain Regional Office
- Denver Service Center
- Utah State Office
- Capitol Reef National Park
- Glen Canyon National Recreation Area

Bureau of Land Management
- Utah State Office
- Cedar City District
- Richfield District

U.S. Fish and Wildlife Service
- Endangered Species Office

Federal Highway Administration
- Region 8 Office, Denver

State of Utah
- Resource Development Coordinating Committee
- Utah Energy Office
- Department of Community and Economic Development
- Office of State Planning and Budget
- Utah Department of Transportation

County Commissioners
- Garfield County, Utah
- Wayne County, Utah

Organizations and Individuals
- Creamer and Noble Engineers
- Sierra Club - Utah Chapter
- Southern Utah Wilderness Alliance
- Five County Association of Governments
- Utah Wilderness Association
- National Parks and Conservation Association
- Kirkwood Oil and Gas
- The Wilderness Society - Central Rockies Region
- Southwest Resource Council
- Several private individuals

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APPENDIX
CONSTRUCTION PARAMETERS AND TYPICAL ROADWAY SECTIONS

Extra light construction. Blade work with compaction, very minor cut and fill with haul. Primarily to restore roadway template and ditches.

Light construction. Minor earthwork; cut and fill with haul, minor adjustments in grade, with maximum cut or fills not exceeding 2 to 3 vertical feet. No major drainages involved.

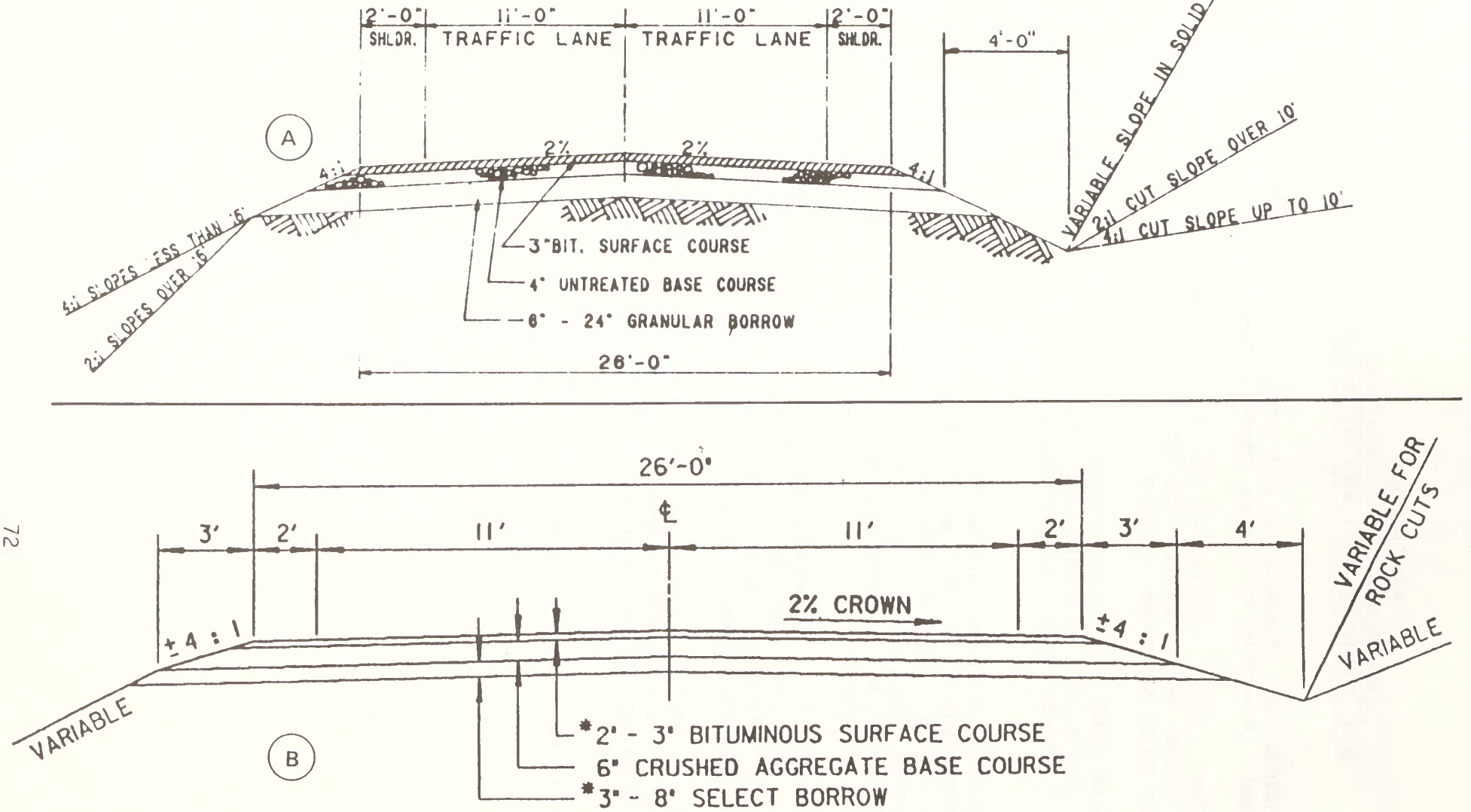
Medium/light construction. Minor earthwork; cut and fill with haul, minor adjustments in grade and alignment with maximum cut and fills not exceeding 4 to 5 vertical feet. Larger diameter pipe and an occasional box culvert.

Medium construction. Average earthwork; cut and fill (8-10 feet) with haul, larger adjustments in line and grade for sight distance and design speed in more rolling, variable terrain. Larger drainage structures, pipes, box culverts, and possibly small bridge structures. Minor rock excavation and fill may be involved with possible minor channel changes required for short distances.

Medium/heavy construction. Heavier earthwork; cut and fill with hauling, some rock excavation with major grade and alignment work. Cuts and fills not exceeding 10-16 feet vertical. Large drainages with box culverts and bridges with possible channel changes for major structures.

Heavy construction. Heaviest earthwork; cut and fill with hauling, large quantities of rock excavation. Cuts and fills from 15-20 feet to whatever is necessary. Major structures required with possible channel changes and large amounts of riprap protection.

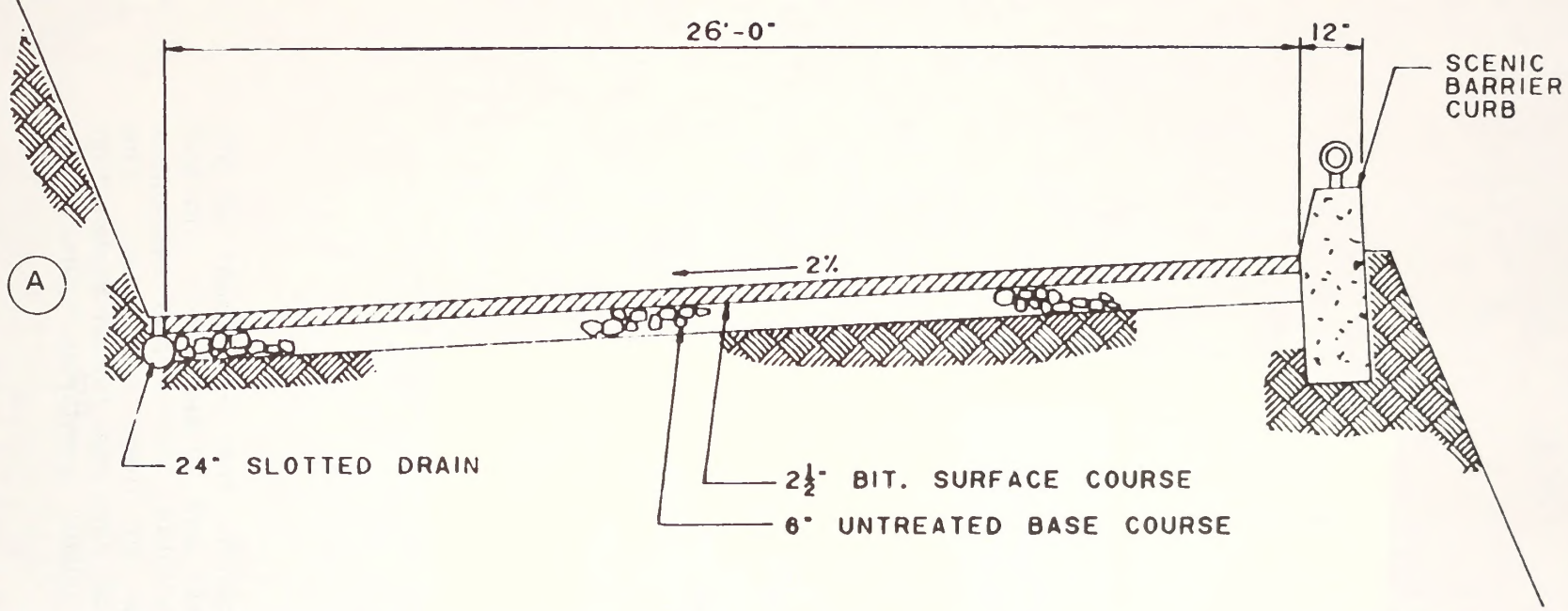
Source: Federal Highway Administration

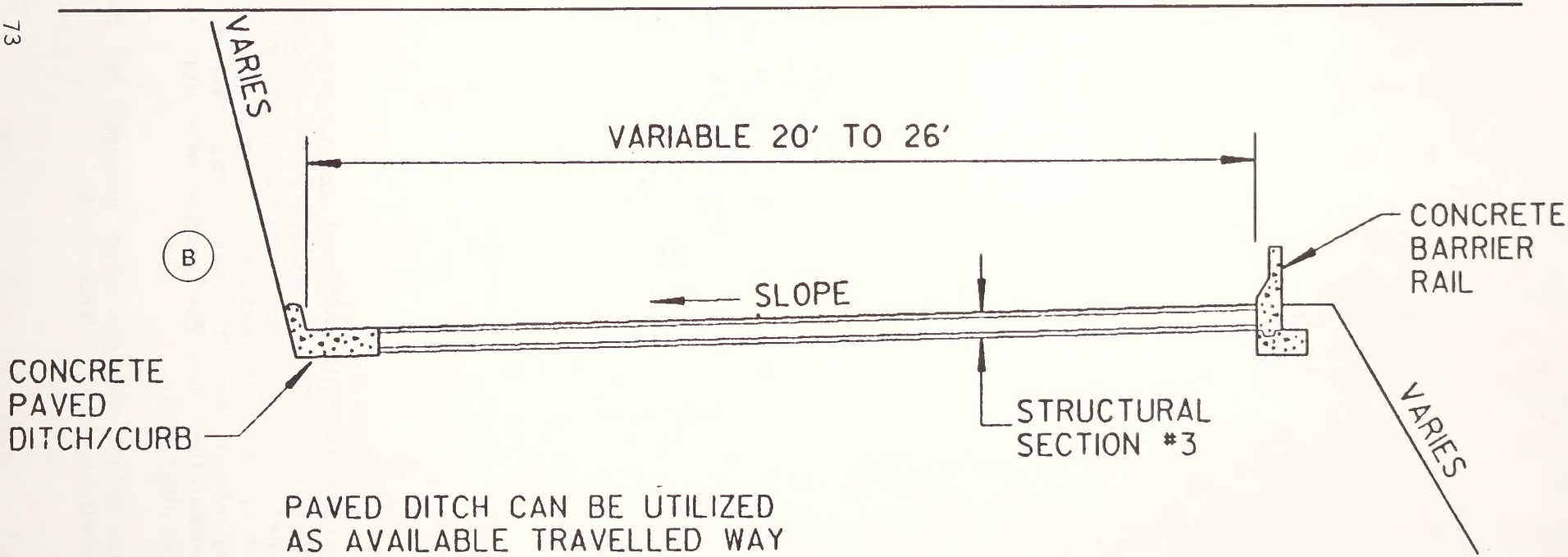


* VARIABLE STRUCTURAL SECTION DEPTHS BASED ON SUBGRADE SOIL CONDITIONS.

Two versions of a typical roadway section through the Boulder-to-Bullfrog road.

Source: (A) Creamer and Noble
(B) Federal Highway Administration





Two versions of a typical roadway section through the Burr Trail switchbacks.

Source: (A) Creamer and Noble
(B) Federal Highway Administration

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